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Firmware
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Starter Kit

RoHS Compliant µWEBox eRouter GPRS/GSM & PSTN User Manual

Comtech Holdings Ltd
www.comtechm2m.com

Comtech M2M—it really is this simple!

About this Booklet

This is a user manual for the Comtech's family of GSM/GPRS and PSTN Routers. The manual shows how to connect the eRouter to a PC, configure the Router, and then make connections to and from the Router over GSM/GPRS or PSTN as appropriate.

The latest version of this manual can be found on our web site:
http://www.comtech.uk.com/downloads/routers/

Additional Assistance

Additional assistance is available:

- Email Support: support@comtech.uk.com
- Download Area (requires login):
  http://www.comtechm2m.com/Downloads/Routers
- Support Forums (requires login):
  http://www.comtechm2m.com/support/forum/
  Comtech have dedicated resources for Internet based technical support.
- Firmware upgrades:: www.comtechm2m.com/downloads/Routers

CE

Notes:

Notes:

Getting Started

This section of the manual will guide you through setting up and configuring the Router for typical applications:

1) Check the contents of the Starter Kit

2) Install a SIM (GSM/GPRS only)

3) Connect a PC for configuration

4) Configure the Router for typical applications

Check the contents of the Starter Kit

Use the illustration and table overleaf to check the contents of the Starter Kit.

Starter Kit Contents

Figure 1 : Starter kit content (GPRS Version)

Qty	Item	Comtech Part No
1	uWEBox eRouter GPRS (900/1800MHz)	
1	110/230VAC to 9VDC/1.7A power supply	PSU-0012
1	9V-36VDC input filter cable*	CABLE-027
1	S-Blade 850/900/1800/1900MHz SMA male plug 1 metre (GPRS Version)	ANTENNA-02
1	PSTN cable (PSTN Version)	CABLE-BT431-RJ11
1	Ethernet Crossover Cable	CABLE-001
1	9 way Serial Cable	CABLE-DATA
1	Getting Started Guide (this document)	RouterUM.PDF

* this must be used if the unit is to be powered from a low voltage power source

Country	Type	+GCI code
Japan	Japan	0
Luxembourg (TBR21+ATAAB)	TBR21	69
Malaysia	Malaysia	6C
Mexico	Mexico	73
Netherlands (TBR21+ATAAB)	TBR21	7B
New Zealand	NZ	7E
Norway (TBR21+ATAAB)	TBR21	82
Paraguay	FCC	87
Philippines	Philippines	89
Poland	TBR21	8A
Portugal (TBR21+ATAAB)	TBR21	8B
Russia	GOST	B8
Singapore	TAS	9C
South Africa	SA	9F
South Korea	FCC	61
Spain (TBR21+ATAAB)	TBR21	A0
Sweden (TBR21+ATAAB)	TBR21	A5
Switzerland (TBR21+ATAAB)	TBR21	A6
Taiwan	Taiwan	FE
United Kingdom (TBR21+ATAAB)	TBR21	B4
United States of America (USA)	FCC	B5

Country	Type	+GCI code
Australia	AUS	9
Austria (TBR21+ATAAB)	TBR21	A
Belgium (TBR21+ATAAB)	TBR21	F
Brazil	Brazil	16
Bulgaria	TBR21	1B
Canada	FCC	20
China	China	26
Columbia	FCC	27
Czech Republic	TBR21	2E
Denmark (TBR21+ATAAB)	TBR21	31
Ecuador	FCC	35
Finland (TBR21+ATAAB)	TBR21	3C
France (TBR21+ATAAB)	TBR21	3D
Germany (TBR21+ATAAB)	TBR21	42
Greece (TBR21+ATAAB)	TBR21	46
Hong Kong	Hong Kong	50
Hungary	Hungary	51
India	India	53
Ireland (TBR21+ATAAB)	TBR21	57
Israel	TBR21	58
Italy (TBR21+ATAAB)	TBR21	59

Install a SIM (GSM/GPRS only)

To use the GSM/GPRS Router, the user will need to provide a SIM. The user will also need to arrange suitable enabling with the network provider based upon the application:

1) For outgoing GSM calls, no special provision is required.

2) For incoming GSM calls, the SIM will need to be "data enabled for incoming GSM data calls". Note: When a SIM is data enabled, it will have two phone numbers, a voice number and a data number. It is the data number which will need to be called.

3) For outgoiong GPRS connectivity, the SIM will need to be “enabled for GPRS”.

4) For incoming GPRS connectivity, the SIM will need to be “enabled for GPRS and have an accessible IP address”. A device making a GPRS connection usually receives a dynamic, private, IP address to which a connection from the internet can not be made. There are ways round this - Contact sales@comtechm2m.com for details.

To install a SIM in the Router, proceed as follows:

1) Disconnect power

2) Remove the four screws which hold the front panel (the one with the LEDs) in place.

3) Slide out the PCBs.

4) Insert a SIM into the SIM socket.

5) Slide the PCBs back into the case

6) Replace the four screws.

Connect a PC for configuration

The Router is configured by establishing a telnet session using a PC. Alternatively, an RS232 connection may be made to the debug port— See later. Suitable settings for typical applications are discussed in subsequent sections of this manual.

1) Connect up the Router

2) Prepare the PC

3) Establish a Telnet Session

4) Change the Configuration Settings

Modem Homologation (PSTN)

Note: This applies to PSTN Routers only.

PSTN modems require configuration for correct operation in different countries. In the Router, this is accomplished by appending a country specific suffix to the modem initialisation string (item 23 in the telnet configuration session).

1) Locate the country in the tables on the following pages.

2) Establish a telnet configuration session with the router.

3) Get the +GCI code (one or two alphanumeric digits) from the table.

4) Modify the modem initialisation string by appending:

   +GCI=xx

   (where xx is the +GCI code from the table)

5) Save the changes and exit.

   eg. The modem initialisation string for a PSTN router operating in the USA would be:

   ATX0V1&D2+GCI=B5

Ordering Information

The following table shows the present variants available from Comtech Holdings Ltd:

Order Code	Details
FR06000211	uWEBox eRouter GSM/GPRS RoHS
FR06000210	uWEBox eRouter GSM/GPRS RoHS Starter Kit
FR06000215	uWEBox eRouter PSTN RoHS
FR06000216	uWEBox eRouter PSTN RoHS Starter Kit

Notes:

Universal 110/230VAC power supply order code is PSU-0012. This is included in the starter kit, and is also available as an accessory item.

For applications which have a DC power supply (9-36VDC) available which is capable of supplying 1.7ADC please order accessory lead “CABLE-027”. This filtered PSU lead is approximately 2m in length with bare wire termination allowing it to be adapted to use and is required for CE compliance.

The eRouter enclosure can be attached to a flat surface using accessory L-shaped brackets (accessory item CASE-0013/M) that fit into the extrusions down the side of the unit. Typically two brackets are required to secure the unit.

For details of alternative GSM antennas available from Comtech please visit our website at http://www.comtechm2m.com

Connect up the Router

The diagram below shows how to connect the components in the Starter Kit.

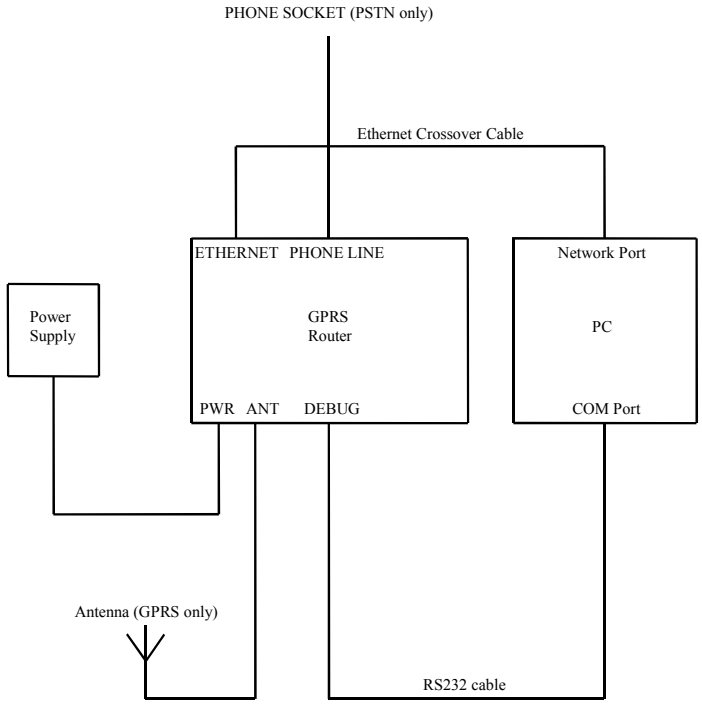


Figure 2: Starter kit connection

Prepare the PC

The Router is configured by making a telnet connection to its telnet server using a PC. The PC should be disconnected from all networks, in order that its network connection settings may be changed without disrupting other networks. In addition, all applications which may attempt to use a network should be closed. Routers are shipped with a default IP address of 192.168.0.1 which may be changed once the telnet session had been established. Configure the PC either to use DHCP, or to have a fixed address on the same subnet as the Router e.g. IP address 192.168.0.10, subnet mask 255.255.255.0. If the PC is to be used verify Router functionality, it will require its gateway address, and DNS address to be set to the address to which the Router is configured e.g. 192.168.0.1 assuming the Router address is left at its default setting.

Establish a Telnet Session

Once the PC has been configured, connect its ethernet port to the Router's ethernet port using the ethernet crossover cable provided. Power up the Router and wait 30 seconds to allow it to boot. A telnet session may be started on the PC using Start>Run>telnet <ip_address>.

EC Declaration of Conformity PSTN Version

EC Declaration of Conformity

We: Comtech Holdings Ltd
Comtech House
28 Manchester Road
Westhougton
Bolton, BL5 3QJ
Lancs
United Kingdom

Declare under our sole responsibility that the following product:

Model description: µWEBox eRouter PSTN
Model #: FR06000215

Meets the essential requirements of the European Directives

89/336 EMC Directive
73/23/EEC Low Voltage Directive
1999/5/EC Radio Equipment & Telecommunications Terminal Equipment Directive

and is in conformity with the following relevant harmonised standards:

EN 55022: 1998 (Class B)
EN 55024: 1998 (Industrial)
EN 301 489-7 V1.2.1: 2002
EN 50121-3-2 : 2000
EN 60950-1 : 2002

Name: Jonathan Shires Position: Engineering Director

Signature: Date: 23rd August 2006

On behalf of Comtech Holdings Ltd

EC Declaration of Conformity GPRS/GSM Version

EC Declaration of Conformity

We: Comtech Holdings Ltd
Comtech House
28 Manchester Road
Westhoughton
Bolton, BL5 3QJ
Lancs
United Kingdom

Declare under our sole responsibility that the following product:

Model description: µWEBox eRouter GSM/GPRS
Model #: FR06000211

Meets the essential requirements of the European Directives

89/336	EMC Directive
73/23/EEC	Low Voltage Directive
1999/5/EC	Radio Equipment & Telecommunications Terminal Equipment Directive
95/54/EEC	Vehicle EMC Directive ("e"-mark #: E11 033945)

and is in conformity with the following relevant harmonised standards:

EN 301 489-7 V1.2.1: 2002
EN 50121-3-2 : 2000
EN 60950-1:2002

Name: Jonathan Shires Position: Engineering Director

Signature: Date: 23rd August 2006

On behalf of Comtech Holdings Ltd

Change the Configuration Settings

When the telnet session connects, the user will be prompted to enter a username and password. Routers are shipped with these set to "username" and "password" respectively. These may be changed after logging in.

Once logged in, the first page of the current configuration settings are displayed. Press Enter to view the next page.

```
Router CPU Flash build: May  8 2006 13:49:24 $Name:  $

Username : username
Password : ********

================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                       =
================================================================================
 0 Abandon Changes      .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .    <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .    <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    1
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    . general.t-mobile.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    01489604407
12 Dialout Username     .    .    .    .    .    .    .    .       username
13 Dialout Password     .    .    .    .    .    .    .    .       password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)     .    .    .    .   DIAL_IN
15 Connection Timeout (sec) (0 to disable)      .    .    .    .    .    .  300
16 PPP Server Local Address      .    .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .    .   00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask      .    .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)      .    .    .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .    0
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .   0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .    49390
28 Serial TCP Baudrate (1200 .. 115200)    .    .    .    .    .    .    9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)     .    .    .    .    .    .    .  NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)      0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .    .    .    .    0
35 Serial TCP Timeout (sec)      .    .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .  115200
37 Predial String       .    .    .    .    .    .    .    .    .    <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .    .   23
39 Command Line   .    .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

Each item is discussed in detail later.

To change a configuration setting, type the number of the setting to

change, then press Enter. At the prompt, enter the new value. After making the changes, press 1, followed by Enter, to save the changes. The changes are retained during power down.

Note: If no keys are pressed for a period of one minute, the Router will automatically close the telnet session.

If the Router has been configured to an unknown IP address, username, or password, thereby preventing telnet access, the debug port can be used to ascertain the current values - See later.

Option 35 allows access to a command line - see the section Command Line later in this manual.

GPRS Connection Details

The following table shows the APN and SMTP email server details for UK GPRS service providers when accessing the internet.

GPRS Connection Details		
Service Provider	APN	SMTP Server (email)
O2	mobile.o2.co.uk	smtp.o2.co.uk
Orange	orangeinternet	smtp.orange.net
Vodafone	Internet	mail.vodafone.net
T-Mobile	general.t-mobile.uk	smtp.t-email.co.uk

The phone number for GPRS connections is *99***1#.

For normal GPRS connections to the internet, any PPP username and password can usually be used but do not leave them blank.

Note: Private APNs will invariably require the correct username and password for the APN.

Note: Some network providers use different APNs to access the internet depending upon whether the SIM is “on contract”, or “pay as you go”.

A good source of international GPRS connection details can be found at this web site http://www.taniwha.org.uk/gprs.html. Thanks to Ross Barkman.

Power Consumption

The table below shows typical power consumption at various voltages:

Typical Current Consumption (mA)					
Product	GSM/GPRS			PSTN	
Test Condition	Powered	GSM Call	GPRS Call	Powered	Call
8V Peak/Avg	320/220	380/340	500/410	210/210	260/250
12V Peak/Avg	230/160	260/230	340/290	140/140	170/170
24V Peak/Avg	140/90	160/140	190/160	80/80	90/90
36V Peak/Avg	110/90	120/110	140/120	60/60	70/70
40V Peak/Avg	110/70	110/100	130/110	50/50	60/60

Configure the Router for Typical Applications

This section highlights how particular settings are appropriate to typical applications. The reader is recommended to go directly to the section of interest, then complete the configuration by referring to the full listing of configuration parameters and their effects presented later in this manual.

1) Use GSM/PSTN to connect a local device/network to the internet/RAS Server

2) Use GSM/PSTN to provide an access point into a remote device/network

3) Use GSM/PSTN to connect a local device/network to the internet/RAS Server, with dial-in support

4) Use GPRS - connect on demand

5) Use GPRS - permanent connection

6) Use GPRS to provide an access point into a remote device

Use GSM/PSTN to connect a local device/network to the internet/RAS Server

These are typical settings where the Router is required to make a GSM/PSTN connection to the internet/RAS Server when there is data to be routed out of the local network, and to tear the connection down when traffic ceases.

```
================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                       =
================================================================================
 0 Abandon Changes     .    .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .    <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .    <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    0
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    . general.t-mobile.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    .   01489604407
12 Dialout Username    .    .    .    .    .    .    .    .    .      username
13 Dialout Password    .    .    .    .    .    .    .    .    .      password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)     .    .    .    . ON_DEMAND
15 Connection Timeout (sec) (0 to disable)     .    .    .    .    .    .  300
16 PPP Server Local Address      .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)    .    .   00-05-11-55-55-55
19 Ethernet LAN IP Address   .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask      .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)     .    .    .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)    .    .    .    .    .    .    0
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .   0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .    49390
28 Serial TCP Baudrate (1200 .. 115200)    .    .    .    .    .    .     9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)     .    .    .    .    .    .    .   NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)     0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .    .    .    .    0
35 Serial TCP Timeout (sec)      .    .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .   115200
37 Predial String      .    .    .    .    .    .    .    .    .    <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .    .   23
39 Command Line   .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

Notes:

```
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    0
```

Setting this to 0 prevents incoming calls being answered.

```
11 Dialout Phone Number     .    .    .    .    .    .    .    .    0800123456
12 Dialout Username    .    .    .    .    .    .    .    .    .      username
13 Dialout Password    .    .    .    .    .    .    .    .    .      password
```


Pinouts

POWER		
Pin	Direction	Description
1	Input	Ground
2	Input	Ground
3	Input	+9DC to 36VDC
4	N/A	**Do Not Connect**

RS232 DEBUG		
Pin	Direction	Description
1	Output	DCD
2	Output	RX
3	Input	TX
4	Input	DTR
5	-	GND
6	Output	DSR (looped to DTR)
7	Input	RTS
8	Output	CTS
9	Output	RI

10/100 BASET ETHERNET		
Pin	Direction	Description
1	Output	TX+
2	Output	TX-
3	Input	RX+
4	N/A	Not Connected
5	N/A	Not Connected
6	Input	RX-
7	N/A	Not Connected
8	N/A	Not Connected

Serial TCP		
Pin	Direction	Description
1	Tx	Output
2	Rx	Input
3	GND	Common

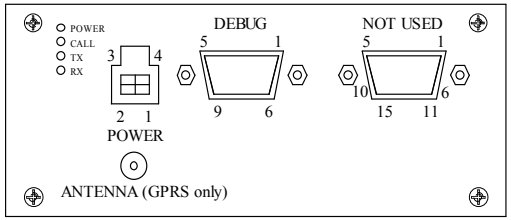
PHONE LINE (PSTN VERSION)		
Pin	Direction	Description
1	N/A	Not Connected
2	I/O	TIP
3	I/O	RING
4	N/A	Not Connected

Antenna Connection (GPRS version)

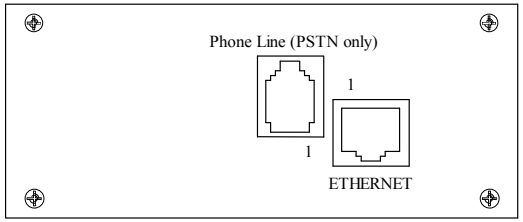
The GPRS router is fitted with a SMA antenna connector. A suitable antenna is supplied in the starter kit.

Connector Details

Connectors



Router Front Panel



Router Rear Panel

These are the details of where the Router will dial. This may be an ISP, or a private RAS Server.

```
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .     ON_DEMAAND
```

This controls the connection type. For GSM and PSTN calls which are usually billed by time, “ON_DEMAND” is usually the most appropriate.

```
15 Connection Timeout (sec) (0 to disable)      .    .    .    .    .    . 300
```

Once routable traffic has ceased, the Router will wait this period before tearing the call down. Whilst setting this to 0 will disable the timeout feature, this is not recommended as occasionally modems may not detect a disconnect from the far end if a line is particularly noisy.

```
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
```

This is the address of the Router on the LAN. Devices using the Router will need their default gateway address setting to this. If they want to use the Router for DNS, they will also need their DNS Server address setting to this value.

```
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
```

These settings control the Router's built in DHCP server. Note: This should be in the same subnet as the LAN. If there is already a DHCP server on the network, set these to 0.0.0.0 and 0 to disable the DHCP server in the Router.

Use GSM/PSTN to provide an access point into a remote device/network

These are typical settings where the Router is used to provide an access point into a remote device or network usually from a PC and modem.

Note: When using a Windows PC to dial the router, ensure the subnet of its network adapter is different to the subnet configured by 19) LAN IP Address, and 20) LAN subnet mask, otherwise the PC may send traffic intended for the router to its Ethernet port instead. It has been observed that whilst the PC may send traffic destined for the router LAN address to the router, it may send all other traffic for the subnet to its Ethernet port. This results in a situation where the router can be PINGed, but devices behind it cannot.

```
================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                       =
================================================================================
 0 Abandon Changes     .    .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .    <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .    <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    1
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    . general.t-mobile.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    .    0800123456
12 Dialout Username    .    .    .    .    .    .    .    .    .      username
13 Dialout Password    .    .    .    .    .    .    .    .    .      password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .    .    DIALIN
15 Connection Timeout (sec) (0 to disable)      .    .    .    .    .    .  300
16 PPP Server Local Address      .    .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .    .   00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask      .    .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)     .    .    .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .    0
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .    .   0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .     49390
28 Serial TCP Baudrate (1200 .. 115200)    .    .    .    .    .    .    .      9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)     .    .    .    .    .    .      NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)      0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .    .    .    .    0
35 Serial TCP Timeout (sec)      .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .    115200
37 Predial String      .    .    .    .    .    .    .    .    <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .    .   23
39 Command Line   .    .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

Notes:

Firmware Upgrades

Firmware upgrades together with the procedure to install them can be found at: <To Be Announced>

Specification

Common

Routing : TCP, IP, UDP, PPP, DNS, NAT, IP Forwarding, DHCP Server, DNS Server, ARP, PING
Operating Modes : Dial-In, Dial-Out On Demand, Permanent
Capacity : Supports up to 10 simultaneous NATed sockets
Power : 8 to 40 Volt DC Molex MiniFit
Ethernet : 10Base-T RJ45
Diagnostics : DB-9 RS232 debug output
Configuration : Telnet session
Status indicators : 4 LEDs
Size : 105x125x45mm Approx

GSM/GPRS version

GPRS : Class 10 4+2
Frequency : Quad band
SIM : Integrated SIM socket (1.8 or 3V)
Antenna Connector : SMA
Operating Temperature : -25 .. 55 DegC
Storage Temperature : -40 .. 85 DegC
Humidity : 95% at 40 DegC non-condensing

PSTN version

Modem : V90
PSTN Connector : RJ11
Approvals : CE, TBR-21
Operating Temperature : 0 .. 70 DegC
Storage Temperature : -40 .. 85 DegC
Humidity : 95% at 40 DegC non-condensing


```
 3 Configuration Username   .   .   .   .   .   .   .   .  username
 4 Configuration Password   .   .   .   .   .   .   .   .  password
```

These are the username and password which will be required by the dialing in device to establish a connection.

```
 5 Configuration Remote Enable (Y/N)  .   .   .   .   .   .   .   .   Y
```

Setting this to Y will allow the Router to be configured remotely.

```
 8 Modem Answer On Ring Number (0 prevents answer)   .   .   .   .   .   1
```

This sets the number of rings the Router will wait before answering a call. For a line shared with voice calls, this number may be increased to allow time for a voice call to be answered before the router picks up the call.

```
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .   .   .   .   DIALIN
```

This instructs the router to answer incoming calls but not make outgoing calls.

```
15 Connection Timeout (sec) (0 to disable)      .   .   .   .   .   .  300
```

Once routable traffic has ceased, the Router will wait this period before tearing the call down. Whilst setting this to 0 will disable the timeout feature, this is not recommended in PSTN applications as occasionally modems may not detect a disconnect from the far end if a line is particularly noisy.

```
19 Ethernet LAN IP Address  .   .   .   .   .   .   .   .   192.168.0.1
```

This is the address of the Router on the LAN.

```
16 PPP Server Local Address      .   .   .   .   .   .   .  192.168.0.245
17 PPP Server Remote Address     .   .   .   .   .   .   .  192.168.0.246
```

These are the IP addresses which will be used for the PPP connection, the local address being that used by the router, and the remote address being the one allocated to the dialing in device. They should lie within the LAN subnet and must not be the same as the Router LAN address, nor should they lie within the DHCP Server range of addresses.

```
25 DHCP Start Address          0.0.0.0
26 DHCP Range                        0
```

Setting these to 0.0.0.0 and 0 to disables the DHCP server. In order to make devices accessible, they will probably be assigned fixed IP

Use GSM/PSTN to connect a local device/network to the internet/RAS Server, with dial-in support

These are typical settings where the Router is required to make a connection to the internet/RAS Server when there is data to be routed out of the local network, and to tear the connection down when traffic ceases. These settings will also allow dial-in access to devices on the local network using for example a PC and a modem.

```
================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                       =
================================================================================
 0 Abandon Changes     .    .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .    <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .    <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    1
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    .    . general.t-mobile.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    .    0800123456
12 Dialout Username    .    .    .    .    .    .    .    .    .      username
13 Dialout Password    .    .    .    .    .    .    .    .    .      password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .    .  ON_DEMAND
15 Connection Timeout (sec) (0 to disable)      .    .    .    .    .    .  300
16 PPP Server Local Address      .    .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .    .   00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask      .    .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)      .    .    .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .    0
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .   0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .    49390
28 Serial TCP Baudrate (1200 .. 115200)    .    .    .    .    .    .     9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)     .    .    .    .    .    .    .  NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)     0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .    .    .    .    0
35 Serial TCP Timeout (sec)      .    .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .    115200
37 Predial String      .    .    .    .    .    .    .    .    .    <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .    .   23
39 Command Line   .    .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

Notes:

```
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
```

These are the username and password which will be required by the dialing in device to establish a connection.

and source and destination ports remain unchanged. Note: For outgoing TCP connections where the source port is 21 (FTP), the address in the “227 Entering Passive Mode” command is changed to the WAN address of the router.

Dial In Connections

The Router will accept incoming PPP calls. The client dialing in is allocated the address specified in the PPP Remote Address configuration. By specifying an address within the local subnet, NAT is circumvented, thereby allowing the client to gain access to server applications.

DNS

When the Router makes a WAN connection, it will usually receive a DNS server address during PPP negotiation. If devices connected to the LAN are configured to use the Router as a DNS server, the Router will forward the requests to the dynamically allocated DNS, and return the results to the originating device.

DHCP

The Router includes a configurable DHCP server. This allows PC's which are configured to use DHCP to be connected to the Router without requiring reconfiguration.

Protocols

The Router supports TCP, UDP and ICMP PING transparently in both directions. PINGing the Router itself is also supported.

PPP Authentication

The Router supports PAP and CHAP authentication. The router will not accept a call where the source won't perform authentication.

Technical Details

The following paragraphs give technical details of the Router implementation.

IP Addresses

The Router connects two networks and therefore requires a valid IP address on each network. The IP address on the ethernet network is configured via the telnet session or the debug port. The WAN address is obtained dynamically during PPP negotiation. The requested WAN address is configurable in the telnet session, however most devices will refuse to negotiate a PPP connection if the requested address is anything other than 0.0.0.0.

Ping

The Router supports ping at the ethernet port, and also at the WAN port for dial in connections. The Router may be configured to silently discarded PINGs arriving at the WAN port thus preventing potentially harmful probing software detecting the Router.

Timeout

The Router ends a call after a period which is configurable via the telnet session or debug port. Only outgoing data keeps the connection live. This prevents potentially harmful probing software keeping the call up.

Network Address Translation (NAT)

Upon receipt of a data packet at the ethernet port, the source IP address and the ethernet MAC address are stored. The IP address in the packet is then replaced with the current WAN IP address, the port number is replaced with a unique port number, then the packet is forwarded to the WAN. Upon receipt of a data packet at the WAN port, the destination IP address is replaced with the source IP address stored earlier, the port number is replaced with the port number stored earlier, then the packet is forwarded to the ethernet port using the MAC address stored earlier. Note: For outgoing TCP connections where the destination port is 21 (FTP), the address in the “PORT” command is changed to the WAN address of the router.

Port Forwarding

When configured, the Router supports Port Forwarding to a single device. All traffic arriving at the WAN port with the WAN address as its destination address, is forwarded to the selected device. Note: The source address


```
 8 Modem Answer On Ring Number (0 prevents answer)   .   .   .   .   .   1
```

This sets the number of rings the Router will wait before answering a call. For a line shared with voice calls, ths number may be increased to allow time for a voice call to be answered before the router picks up the call.

```
11 Dialout Phone Number     .   .   .   .   .   .   .   .     0800123456
12 Dialout Username     .   .   .   .   .   .   .   .   .       username
13 Dialout Password     .   .   .   .   .   .   .   .   .       password
```

These are the details of where the Router will dial. This may be an ISP, or a private RAS Server.

```
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .   .   .      ON_DEMAND
```

This instructs the router to make a call when it receives data which requires routing.

```
15 Connection Timeout (sec) (0 to disable)      .   .   .   .   .   . 300
```

Once routable traffic has ceased, the Router will wait this period before tearing the call down. Whilst setting this to 0 will disable the timeout feature, this is not recommended in PSTN applications as occasionally modems may not detect a disconnect from the far end if a line is particularly noisy.

```
16 PPP Server Local Address      .   .   .   .   .   .   . 192.168.0.245
17 PPP Server Remote Address     .   .   .   .   .   .   . 192.168.0.246
```

These are the IP addresses which will be used for the PPP connection, the local address being that used by the router, and the remote address being the one allocated to the dialing in device. They should lie within the LAN subnet and must not be the same as the Router LAN address, nor should they lie within the DHCP Server range of addresses.

```
19 Ethernet LAN IP Address  .   .   .   .   .   .   .   .   192.168.0.1
```

This is the address of the Router on the LAN. Devices using the Router will need their default gateway address setting to this. If they want to use the Router for DNS, they will also need their DNS Server address setting to this value.

```
25 DHCP Start Address          0.0.0.0
26 DHCP Range                        0
```

Setting these to 0.0.0.0 and 0 to disables the DHCP server. In order to make devices accessible, they will probably be assigned fixed IP

Use GPRS - connect on demand

These are typical settings where the Router is required to make a GPRS connection when there is data to be routed out of the local network, and to tear the connection down when traffic ceases.

```
================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                       =
================================================================================
 0 Abandon Changes     .    .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .    .  <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .    .  <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    1
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    . general.t-mobile.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    .       *99***1#
12 Dialout Username    .    .    .    .    .    .    .    .    .       username
13 Dialout Password    .    .    .    .    .    .    .    .    .       password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .      ON_DEMAND
15 Connection Timeout (sec) (0 to disable)      .    .    .    .    .    .  300
16 PPP Server Local Address      .    .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .    .   00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask      .    .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)      .    .    .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .    0
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .    .   0.0.0.0
27 Serial TCP Port (0 to disable)      .    .    .    .    .    .    .     49390
28 Serial TCP Baudrate (1200 .. 115200)    .    .    .    .    .    .      9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)     .    .    .    .    .    .      NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)      0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .    .    .    .    0
35 Serial TCP Timeout (sec)      .    .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .    115200
37 Predial String      .    .    .    .    .    .    .    .    .  <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .    .   23
39 Command Line   .    .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

Notes:

```
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    0
```

Setting this to 0 prevents incoming calls being answered. Note: If a GPRS connection is established, incoming calls are ignored.

```
10 Dialout GPRS Access Point Name (APN)     .    .    .    . general.t-mobile.uk
```

This is the Access Point Name which determines where the GPRS connection will terminate. See the appendix for common APNs used to

Serial Streaming

By setting configuration parameters 27 .. 32, the Router can give either a local or remote device access to an RS232 serial port. Note: This is a three-wire interface and handshaking is not supported.

The Router waits for an incoming TCP connection on the configured port. Data received from the connection is sent out of the serial port. Data received by the serial port is forwarded through the connection based on the configuration parameters.

Command Line

The Router has a command line which is accessible both via the debug port, and via the Telnet configuration menu (item 36).

Warning: Use the command line with caution - Changing some settings may render the Router inoperable.

The following commands display signal strength , and GPS location (GPS enabled model only).

RSSI

This command displays the signal strength using the values 0 to 31. A signal strength of 8 or more is usually sufficient for reliable communication. The value is updated every 15 seconds when a call is down. When a call is up, the last value prior to the cal is returned.

GPS

For Routers fitted with the GPS option, this command displays the current location and speed etc. using standard NEMA format. The information is repeated for approximately one minute or may be terminated by pressing any key.

access the internet. Note: Some network providers use different APNs to access the internet depending upon whether the SIM is “on contract”, or “pay as you go”.

```
11 Dialout Phone Number    .   .   .   .   .   .   .   .      *99***1#
```

This is the "magic number" used to establish a GPRS connection.

```
12 Dialout Username    .   .   .   .   .   .   .   .   .      username
13 Dialout Password    .   .   .   .   .   .   .   .          password
```

These are the details which will be used to establish the GPRS connection. For standard connections to the internet, values are usually required though they are not checked. For private APNs the values are usually significant.

```
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .   .   .     ON_DEMAND
```

This instructs the router to make a call when it receives data which requires routing.

```
15 Connection Timeout (sec) (0 to disable)      .   .   .   .   .   . 300
```

Once routable traffic has ceased, the Router will wait this period before tearing the call down.

```
19 Ethernet LAN IP Address  .   .   .   .   .   .   .   .   192.168.0.1
```

This is the address of the Router on the LAN. Devices using the Router will need their default gateway address setting to this. If they want to use the Router for DNS, they will also need their DNS Server address setting to this value.

```
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     . 192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .   .   .   .   .   .   25
```

These settings control the Router's built in DHCP server. Note: This should be in the same subnet as the LAN. If there is already a DHCP server on the network, set these to 0.0.0.0 and 0 to disable the DHCP server in the Router.

Use GPRS - permanent connection

These are typical settings where the Router is required to make a permanent GPRS connection. Since GPRS data is charged by traffic rather than connection time, this is a commonly used configuration. Note: Use of the Automated PING feature (23,24) is strongly recommended in GPRS always connected applications.

```
================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                       =
================================================================================
 0 Abandon Changes     .    .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .    <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .    <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    0
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    . general.t-mobile.uk
11 Dialout Phone Number     .    .    .    .    .    .    .       *99***1#
12 Dialout Username    .    .    .    .    .    .    .    .       username
13 Dialout Password    .    .    .    .    .    .    .    .       password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .    PERMANENT
15 Connection Timeout (sec) (0 to disable)     .    .    .    .    .    .  300
16 PPP Server Local Address      .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .    .   00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask     .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)     .    .    .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .   60
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .   0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .    49390
28 Serial TCP Baudrate (1200 .. 115200)    .    .    .    .    .    .    9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)     .    .    .    .    .    .    .   NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)     0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .    .    .    .    0
35 Serial TCP Timeout (sec)     .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .   115200
37 Predial String      .    .    .    .    .    .    .    .    <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .   23
39 Command Line   .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

Notes:

```
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    0
```

Setting this to 0 prevents incoming calls being answered. Note: If a GPRS connection is established, incoming calls are ignored.

```
10 Dialout GPRS Access Point Name (APN)    .    .    .    . general.t-mobile.uk
```



```
================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                       =
================================================================================
 0 Abandon Changes     .    .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .    <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .    <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    1
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    .    .    .    wyless.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    0800 123456
12 Dialout Username    .    .    .    .    .    .    .    .    .  username
13 Dialout Password    .    .    .    .    .    .    .    .    .  password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .    .    DIALIN
15 Connection Timeout (sec) (0 to disable)     .    .    .    .    .    .    0
16 PPP Server Local Address      .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .    .   00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask     .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)     .    .    .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .    0
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .   0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .    49390
28 Serial TCP Baudrate (1200 .. 115200)    .    .    .    .    .    .    9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)     .    .    .    .    .    .    .   NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)     0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .    .    .    .    0
35 Serial TCP Timeout (sec)     .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .   115200
37 Predial String      .    .    .    .    .    .    .    .    <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .   23
39 Command Line   .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

Debug Port

The Router has an RS232 debug port which may be used to set the configuration parameters and to assist with diagnosing problems. The debug information includes error messages identifying SIM and network problems. It also includes the Router username, password, and IP address which are required to establish a telnet session to configure the Router.

Connect a PC running a terminal emulation package (eg. Hyperterminal) set to 115200 baud, 1 start, 8 data, no parity, 1 stop, no handshake.

Once powered up, the router sends diagnostic information to PC. Debug information is suspended for one minute when any key is pressed. To change configuration parameters, press Enter to suspend debug information, and access the command line. Type “menu” then press Enter to access the Menu. The first page of the current configuration settings is displayed. Press Enter to view the next page.

To change a configuration setting, type the number of the setting to change, then press Enter. At the prompt, enter the new value. After making the changes, press '1', followed by Enter, to save the changes. The changes are retained during power down.

A typical configuration is shown overleaf.

This is the Access Point Name which determines where the GPRS connection will terminate. See the appendix for common APNs used to access the internet. Note: Some network providers use different APNs to access the internet depending upon whether the SIM is “on contract”, or “pay as you go”.

```
11 Dialout Phone Number     .   .   .   .   .   .   .      *99***1#
```

This is the "magic number" used to establish a GPRS connection.

```
12 Dialout Username     .   .   .   .   .   .   .   .      username
13 Dialout Password     .   .   .   .   .   .   .          password
```

These are the details which will be used to establish the GPRS connection. For standard connections to the internet, values are usually required though they are not checked. For private APNs the values are usually significant.

```
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .   .   .      PERMANENT
```

This instructs the router to make a call at power-up, and keep it permanently up.

```
15 Connection Timeout (sec) (0 to disable)      .   .   .   .   .   .   0
```

Disable inactivity timeout.

```
19 Ethernet LAN IP Address  .   .   .   .   .   .   .   .   192.168.0.1
```

This is the address of the Router on the LAN. Devices using the Router will need their default gateway address setting to this. If they want to use the Router for DNS, they will also need their DNS Server address setting to this value.

```
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .   .   .   .   .   .   25
```

These settings control the Router's built in DHCP server. Note: This should be in the same subnet as the LAN. If there is already a DHCP server on the network, set these to 0.0.0.0 and 0 to disable the DHCP server in the Router.

```
23 Automated PING Address (0.0.0.0 PINGs DNS server)      .   .   .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .   .   .   .   .   .   60
```

These control the ping connection integrity check. The address is the address to ping, and the period the time between pings. If a ping does not receive a reply after three attempts, the Router assumes the GPRS

attachment has been lost, and tears down, then reestablishes the connection. The address should be set to an address of particular interest eg. the server the local devices will be connecting to. If a period is set, but the address is set to 0.0.0.0, the Router pings the DNS Server who's address it received from the network when the GPRS attachment was made. The period should be set based on how important loss of connectivity is, versus the cost of sending and receiving ping packets. Use of this feature is strongly recommended in GPRS always connected applications.

Warning: There are no restrictions on what commands may be sent to the modem and whilst some are useful (eg. AT+CSQ to get signal strength), others may render the router inoperable.

A full list of commands is available at:
http://www.comtechm2m.com/Downloads/GsmGprsModems/OEM-GPRS-2E/Gprs_at.pdf

Sending an SMS

The GPRS/GSM Router supports sending SMSs by allowing a TCP connection directly to the modem. Note: Making the connection takes precedence over routing. If a call is up when the connection is made, the call will be torn down. Whilst most applications will use a program to send the SMS, for demonstration purposes, a telnet client may used. Hyperterminal or similar is recommended as the command line client in WindowsXP performs local echo which cannot be turned off from the keyboard, making sending the SMS confusing.

The following procedure will send an SMS:

1) Use Hyperterminal or similar to make a TCP/IP (Winsock) connection to the LAN address (192.168.0.1 by default) of the router on port 49389. If the router has a call up, it will take approximately 15 seconds for the router to tear the call down before allowing access to the modem.

2) Verify communication with the modem by typing AT followed by carriage return. The modem should respond with "OK"

```
AT
OK
```

3) Type AT+CMGS="phone_number" (including the quotes) then press carriage return. The modem should reply with a chevron prompt.

```
AT+CMGS="0800123456"
>
```

4) Type the message, then press <CTRL Z> to finish. The <CTRL Z> may or may not be visible depending upon which telnet client you are using. After a few seconds, the modem should reply with a send number, followed by OK

```
>This is the message.
+CMGS: 206

OK
```

5) To terminate the connection to the modem, close the telnet session. Note: There is a 60 second timeout on the connection ie. If the connection remains open for 60 seconds, but no characters are sent to the modem, the router will close the connection.

addresses, and not use DHCP.

This page intentionally left blank

addresses, and not use DHCP.

Use GPRS to provide an access point into a remote device

When a GPRS connection is made, the connecting device receives an IP address which is usually private and dynamic. In order to access the internet, the network provider supports routing between their private network, and the internet. This invariably involves Network Address Translation (NAT) and Port Address Translation (PAT). Their router providing this functionality however acts as a firewall blocking all traffic where a connection is trying to be made from the internet into their private network. SIMS are however available which receive static, private IP addresses, and there are methods of accessing the private network. Contact sales@comtechm2m.com for further details. Using such a SIM, and enabling IP forwarding, as shown below, allows a single device to be remotely accessed using GPRS. Note: Use of the Automated PING feature (23,24) is strongly recommended in GPRS always connected applications.

```
================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                       =
================================================================================
 0 Abandon Changes     .    .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .     <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .     <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)    .    .    .    .    .    0
 9 Modem Reset Interval (mins) (0 to disable)    .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    . general.t-mobile.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    .       *99***1#
12 Dialout Username     .    .    .    .    .    .    .    .    .       username
13 Dialout Password     .    .    .    .    .    .    .    .    .       password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .    .      PERMANENT
15 Connection Timeout (sec) (0 to disable)      .    .    .    .    .    .  300
16 PPP Server Local Address      .    .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)    .    .   00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask      .    .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)      .    .    .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .   60
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .   0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .     49390
28 Serial TCP Baudrate (1200 .. 115200)     .    .    .    .    .    .      9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)      .    .    .    .    .    .      NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)      0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .    .    .    .    0
35 Serial TCP Timeout (sec)      .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .    115200
37 Predial String      .    .    .    .    .    .    .    .     <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .    .   23
39 Command Line   .    .    .    .    .    .    .    .    .    .    .    .    .

Select >
```


LED	DESCRIPTION
POWER	Lights Red when the unit is powered up. Changes to Orange whilst the modem registers with the network. Changes to Red, with a short Orange flash approximately every two seconds, when the modem is registered with the network.
SIGNAL STRENGTH /CALL	For GSM/GPRS Routers this LED flashes Orange to indicate signal strength. Flashes / CSQ / Signal 0 / 0 .. 4 / None 1 / 5 .. 7 / Weak 2 / 8 .. 9 / Moderate 3 / 10 .. 14 / OK 4 / 15 .. 31 / Good Lights Orange when a call is established and PPP has finished negotiation ie. lights when the router is ready to pass data.
TX	Flashes Green when data is detected at the ethernet port. This data will be passed to the WAN port if the Orange LED is lit.
RX	Flashes Green when data is received at the WAN port for routing to the ethernet port.

Figure 3 : LED Indicators

Status LEDs

The Router is equipped with 4 status LEDs.

At power up, all four LEDs will light and remain lit for approximately 20 seconds whilst the Router verifies its firmware.

The SIGNAL STRENGTH/CALL, TX, and RX LEDs will then flash simultaneously for approximately 30 seconds whilst the modem is initialised. For the GSM/GPRS Router, if the SIM is missing, locked, or the Router is unable to register with the network, the SIGNAL STRENGTH/CALL, TX, and RX LEDs will continue to flash.

Thereafter, the LEDS will indicate call status as per Figure 3 opposite.

The SIGNAL STRENGTH/CALL, TX, and RX LEDs also flash simultaneously whilst a call is being torn down, and the modem is being reinitialised ready to make the next call.

Notes:

```
 8 Modem Answer On Ring Number (0 prevents answer)   .   .   .   .   .   0
```

Setting this to 0 prevents incoming calls being answered. Note: If a GPRS connection is established, incoming calls are ignored.

```
11 Dialout Phone Number     .   .   .   .   .   .   .   .      *99***1#
```

This is the "magic number" used to establish a GPRS connection.

```
12 Dialout Username     .   .   .   .   .   .   .   .   .      username
13 Dialout Password     .   .   .   .   .   .   .   .          password
```

These are the details which will be used to establish the GPRS connection. For standard connections to the internet, values are usually required though they are not checked. For private APNs the values are usually significant.

```
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .   .   .      PERMANENT
```

This instructs the router to make a call at power-up, and keep it permanently up.

```
15 Connection Timeout (sec) (0 to disable)      .   .   .   .   .   .   0
```

Disable inactivity timeout.

```
10 Dialout GPRS Access Point Name (APN)    .   .   .   . general.t-mobile.uk
```

This is the Access Point Name which determines where the GPRS connection will terminate. See the appendix for common APNs used to access the internet. Note: Some network providers use different APNs to access the internet depending upon whether the SIM is “on contract”, or “pay as you go”.

```
19 Ethernet LAN IP Address  .   .   .   .   .   .   .   .   192.168.0.1
```

This is the address of the Router on the LAN. Devices using the Router will need their default gateway address setting to this. If they want to use the Router for DNS, they will also need their DNS Server address setting to this value.

```
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .   .   .   .   .   .   25
```

These settings control the Router's built in DHCP server. Note: This

should be in the same subnet as the LAN. If there is already a DHCP server on the network, set these to 0.0.0.0 and 0 to disable the DHCP server in the Router.

```
23 Automated PING Address (0.0.0.0 PINGs DNS server)      .    .    .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .   .   60
```

These control the ping connection integrity check. The address is the address to ping, and the period the time between pings. If a ping does not receive a reply after three attempts, the Router assumes the GPRS attachment has been lost, and tears down, then reestablishes the connection. The address should be set to an address of particular interest eg. the server the local devices will be connecting to. If a period is set, but the address is set to 0.0.0.0, the Router pings the DNS Server who's address it received from the network when the GPRS attachment was made. The period should be set based on how important loss of connectivity is, versus the cost of sending and receiving ping packets. Use of this feature is strongly recommended in GPRS always connected applications.

```
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .   0.0.0.0
```

This is the address which traffic sent to the Router WAN address (ie. that set by the SIM) will be forwarded on to. Note: If Remote Configuration is enabled, then traffic destined for port 23 (Telnet) will be sent to the Router configuration session, rather than forwarded. Note: Ping traffic is forwarded - It is up to the destination device to respond to the ping if it so chooses.

No.	PARAMETER	DESCRIPTION
36	Modem Max Baudrate	This setting allows the baud rate to the modem to be limited
37	Predial String	An optional string (typically an AT command) which will be sent to the modem immediately before dialing.
38	Telnet Configuration Port Number	The TCP port number used by the telnet configuration session (typically 23).
39	Command Line	Exit menu and go to command line mode

No.	PARAMETER	DESCRIPTION
26	IP Forwarding Address	IP packets arriving from the WAN which cannot be Network Address Translated, are forwarded to this address. Set to 0.0.0.0 to disable this feature. This is how a server is accessed.
27	Serial TCP Port	The TCP port number which is routed to the serial port. Set to 0 to disable this feature.
28	Serial TCP Baudrate	Baudrate of the serial port.
29	Serial TCP Data Bits	7 or 8 data bits per byte
30	Serial TCP Parity	None, Odd, Even parity
31	Serial TCP stop bits	1 or 2
32	Serial TCP Forwarding Character	A character which forces accumulated serial data to be sent. Set to 0 to disable this feature. Set to 256 to forward on NULL.
33	Serial TCP Forwarding Length	A length of data which forces accumulated data to be sent. Set to 0 to disable this feature.
34	Serial TCP Forwarding Timeout	An idle period which forces accumulated data to be sent. Set to 0 to disable this feature
35	Serial TCP Timeout (sec)	If no data is received from the WAN, the TCP socket is closed after this period.

Configuration Parameters

This section of the manual lists the configuration parameters and gives details of how they affect the operation of the Router.

Configuration Parameters		
No.	**PARAMETER**	**DESCRIPTION**
0	Abandon Changes	Abandon Changes and close the Telnet session
1	Save Changes	Save changes, close the telnet session and reboot.
2	Factory Defaults	Restore factory default settings. Select Save Changes to make the settings permanent.
3	Configuration Username	Username required to establish a local telnet session for configuration, and to establish a Dial In connection.
4	Configuration Password	Password required to establish a local telnet session for configuration, and to establish a Dial In connection
5	Configuration Remote Enable	Enable remote configuration over the WAN when router dials out.
6	Modem Initialisation String	The string used to initialise the modem. **Warning: An incorrect initialisation string may prevent the router from operating.**
7	Modem SIM PIN Number	PIN number to unlock SIM. Set to blank if the SIM does not require a PIN number. This is ignored if the SIM does not require a PIN number.

No.	PARAMETER	DESCRIPTION
8	Modem Answer On Ring Number	This sets the number of rings the Router will wait before answering a call. For a line shared with voice calls, ths number may be increased to allow time for a voice call to be answered before the router picks up the call. Setting this to 0 prevents calls being answered.
9	Modem Reset Interval	Reset the modem at regular intervals if it isn't in a call.
10	Dialout GPRS Access Point Name (APN)	Access Point Name to terminate the GPRS connection.
11	Dialout Phone Number	Phone number of the Internet Service Provider. For GPRS this may include '*' and '#' characters.
12	Dialout Username	Login username. For GPRS, a name is typically required, though any name is usually accepted for access to an Internet APN.
13	Dialout Password	Login password. For GPRS, a password is typically required, though any password is usually accepted for access to an internet APN.
14	Connection Type	DIALIN prevents outgoing calls. ON_Demand makes a call whenever the router receives routable traffic at the Ethernet port. PERMANENT maintains a permanent connection regardless of traffic.
15	Connection Timeout	Period after last outgoing packet, after which the router will tear the call down. Set to 0 to disable this feature.

No.	PARAMETER	DESCRIPTION
16	PPP Server Local Address	The IP address used by the Router when it accepts an incoming call.
17	PPP Server Remote Address	Address allocated via PPP to the remote device when an incoming call is answered.
18	Ethernet MAC Address	MAC address of the Router ethernet port.
19	Ethernet LAN IP Address	IP address of the Router Ethernet port.
20	Ethernet LAN Subnet Mask	Subnet mask for the ethernet port
21	Ethernet DHCP Server Start Address	Lowest address the DHCP server will offer. Set to 0.0.0.0 to disable the DHCP server.
22	Ethernet DHCP Server Range	Range of addresses the DHCP server will offer. Set to 0 to disable the DHCP server.
23	Automated PING Address	This address is pinged at the Ping Period, to maintain the GPRS connection and to verify the connection integrity. Set to 0.0.0.0 to ping the DNS server negotiated during PPP.
24	Automated PING Period	The Ping Address is pinged at this period to maintain the GPRS connection and to verify the connection integrity. Set to 0 to disable this feature. Maximum value 28800 = 8 hours.
25	Respond to PING on WAN	Setting this to Y allows the router to respond to Pings on the WAN port. Note: if IP forwarding is enabled, the Pings are forwarded to the destination device which may or may not respond.

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change, then press Enter. At the prompt, enter the new value. After making the changes, press 1, followed by Enter, to save the changes. The changes are retained during power down.

Note: If no keys are pressed for a period of one minute, the Router will automatically close the telnet session.

If the Router has been configured to an unknown IP address, username, or password, thereby preventing telnet access, the debug port can be used to ascertain the current values - See later.

Option 35 allows access to a command line - see the section Command Line later in this manual.

GPRS Connection Details

The following table shows the APN and SMTP email server details for UK GPRS service providers when accessing the internet.

GPRS Connection Details		
Service Provider	APN	SMTP Server (email)
O2	mobile.o2.co.uk	smtp.o2.co.uk
Orange	orangeinternet	smtp.orange.net
Vodafone	Internet	mail.vodafone.net
T-Mobile	general.t-mobile.uk	smtp.t-email.co.uk

The phone number for GPRS connections is *99***1#.

For normal GPRS connections to the internet, any PPP username and password can usually be used but do not leave them blank.

Note: Private APNs will invariably require the correct username and password for the APN.

Note: Some network providers use different APNs to access the internet depending upon whether the SIM is “on contract”, or “pay as you go”.

A good source of international GPRS connection details can be found at this web site http://www.taniwha.org.uk/gprs.html. Thanks to Ross Barkman.

Power Consumption

The table below shows typical power consumption at various voltages:

Typical Current Consumption (mA)					
Product	GSM/GPRS			PSTN	
Test Condition	Powered	GSM Call	GPRS Call	Powered	Call
8V Peak/Avg	320/220	380/340	500/410	210/210	260/250
12V Peak/Avg	230/160	260/230	340/290	140/140	170/170
24V Peak/Avg	140/90	160/140	190/160	80/80	90/90
36V Peak/Avg	110/90	120/110	140/120	60/60	70/70
40V Peak/Avg	110/70	110/100	130/110	50/50	60/60

Configure the Router for Typical Applications

This section highlights how particular settings are appropriate to typical applications. The reader is recommended to go directly to the section of interest, then complete the configuration by referring to the full listing of configuration parameters and their effects presented later in this manual.

1) Use GSM/PSTN to connect a local device/network to the internet/RAS Server

2) Use GSM/PSTN to provide an access point into a remote device/network

3) Use GSM/PSTN to connect a local device/network to the internet/RAS Server, with dial-in support

4) Use GPRS - connect on demand

5) Use GPRS - permanent connection

6) Use GPRS to provide an access point into a remote device

Use GSM/PSTN to connect a local device/network to the internet/RAS Server

These are typical settings where the Router is required to make a GSM/PSTN connection to the internet/RAS Server when there is data to be routed out of the local network, and to tear the connection down when traffic ceases.

```
================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                       =
================================================================================
 0 Abandon Changes     .    .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .     <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .     <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    0
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    .  general.t-mobile.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    .    01489604407
12 Dialout Username    .    .    .    .    .    .    .    .    .      username
13 Dialout Password    .    .    .    .    .    .    .    .    .      password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .    . ON_DEMAND
15 Connection Timeout (sec) (0 to disable)     .    .    .    .    .    .  300
16 PPP Server Local Address      .    .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .    .   00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask      .    .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)      .    .    .    .  0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .    0
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .    .  0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .    .  49390
28 Serial TCP Baudrate (1200 .. 115200)    .    .    .    .    .    .    .   9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)     .    .    .    .    .    .    .  NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)     0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .    .    .    .    0
35 Serial TCP Timeout (sec)      .    .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .  115200
37 Predial String      .    .    .    .    .    .    .    .    .     <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .    .   23
39 Command Line   .    .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

Notes:

```
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    0
```

Setting this to 0 prevents incoming calls being answered.

```
11 Dialout Phone Number     .    .    .    .    .    .    .    .    0800123456
12 Dialout Username    .    .    .    .    .    .    .    .    .      username
13 Dialout Password    .    .    .    .    .    .    .    .    .      password
```


Pinouts

POWER		
Pin	Direction	Description
1	Input	Ground
2	Input	Ground
3	Input	+9DC to 36VDC
4	N/A	**Do Not Connect**

RS232 DEBUG		
Pin	Direction	Description
1	Output	DCD
2	Output	RX
3	Input	TX
4	Input	DTR
5	-	GND
6	Output	DSR (looped to DTR)
7	Input	RTS
8	Output	CTS
9	Output	RI

10/100 BASET ETHERNET		
Pin	Direction	Description
1	Output	TX+
2	Output	TX-
3	Input	RX+
4	N/A	Not Connected
5	N/A	Not Connected
6	Input	RX-
7	N/A	Not Connected
8	N/A	Not Connected

Serial TCP		
Pin	Direction	Description
1	Tx	Output
2	Rx	Input
3	GND	Common

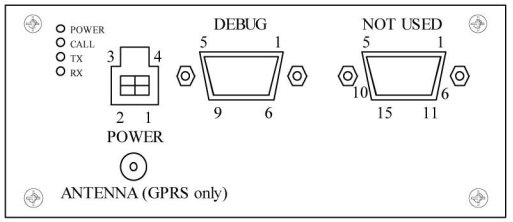
PHONE LINE (PSTN VERSION)		
Pin	Direction	Description
1	N/A	Not Connected
2	I/O	TIP
3	I/O	RING
4	N/A	Not Connected

Antenna Connection (GPRS version)

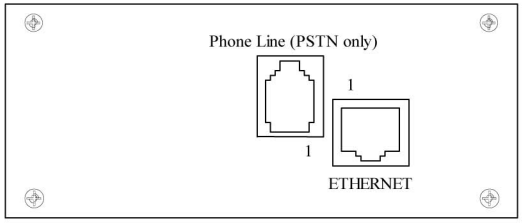
The GPRS router is fitted with a SMA antenna connector. A suitable antenna is supplied in the starter kit.

Connector Details

Connectors



Router Front Panel



Router Rear Panel

These are the details of where the Router will dial. This may be an ISP, or a private RAS Server.

```
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .     ON_DEMAAND
```

This controls the connection type. For GSM and PSTN calls which are usually billed by time, “ON_DEMAND” is usually the most appropriate.

```
15 Connection Timeout (sec) (0 to disable)      .    .    .    .    .    .  300
```

Once routable traffic has ceased, the Router will wait this period before tearing the call down. Whilst setting this to 0 will disable the timeout feature, this is not recommended as occasionally modems may not detect a disconnect from the far end if a line is particularly noisy.

```
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
```

This is the address of the Router on the LAN. Devices using the Router will need their default gateway address setting to this. If they want to use the Router for DNS, they will also need their DNS Server address setting to this value.

```
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
```

These settings control the Router's built in DHCP server. Note: This should be in the same subnet as the LAN. If there is already a DHCP server on the network, set these to 0.0.0.0 and 0 to disable the DHCP server in the Router.

Use GSM/PSTN to provide an access point into a remote device/network

These are typical settings where the Router is used to provide an access point into a remote device or network usually from a PC and modem.

Note: When using a Windows PC to dial the router, ensure the subnet of its network adapter is different to the subnet configured by 19) LAN IP Address, and 20) LAN subnet mask, otherwise the PC may send traffic intended for the router to its Ethernet port instead. It has been observed that whilst the PC may send traffic destined for the router LAN address to the router, it may send all other traffic for the subnet to its Ethernet port. This results in a situation where the router can be PINGed, but devices behind it cannot.

```
================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                        =
================================================================================
 0 Abandon Changes     .    .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .    <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .    <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    1
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    . general.t-mobile.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    .    0800123456
12 Dialout Username    .    .    .    .    .    .    .    .    .      username
13 Dialout Password    .    .    .    .    .    .    .    .    .      password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)     .    .    .    .    DIALIN
15 Connection Timeout (sec) (0 to disable)      .    .    .    .    .    .  300
16 PPP Server Local Address      .    .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .    .   00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask      .    .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)     .    .    .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .    0
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .   0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .     49390
28 Serial TCP Baudrate (1200 .. 115200)    .    .    .    .    .    .      9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)     .    .    .    .    .    .      NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)     0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .    .    .    .    0
35 Serial TCP Timeout (sec)      .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .    115200
37 Predial String      .    .    .    .    .    .    .    .    .    <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .    .   23
39 Command Line   .    .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

Notes:

Firmware Upgrades

Firmware upgrades together with the procedure to install them can be found at: <To Be Announced>

Specification

Common

Routing : TCP, IP, UDP, PPP, DNS, NAT, IP Forwarding, DHCP Server, DNS Server, ARP, PING
Operating Modes : Dial-In, Dial-Out On Demand, Permanent
Capacity : Supports up to 10 simultaneous NATed sockets
Power : 8 to 40 Volt DC Molex MiniFit
Ethernet : 10Base-T RJ45
Diagnostics : DB-9 RS232 debug output
Configuration : Telnet session
Status indicators : 4 LEDs
Size : 105x125x45mm Approx

GSM/GPRS version

GPRS : Class 10 4+2
Frequency : Quad band
SIM : Integrated SIM socket (1.8 or 3V)
Antenna Connector : SMA
Operating Temperature : -25 .. 55 DegC
Storage Temperature : -40 .. 85 DegC
Humidity : 95% at 40 DegC non-condensing

PSTN version

Modem : V90
PSTN Connector : RJ11
Approvals : CE, TBR-21
Operating Temperature : 0 .. 70 DegC
Storage Temperature : -40 .. 85 DegC
Humidity : 95% at 40 DegC non-condensing


```
 3 Configuration Username   .   .   .   .   .   .   .   .  username
 4 Configuration Password   .   .   .   .   .   .   .   .  password
```

These are the username and password which will be required by the dialing in device to establish a connection.

```
 5 Configuration Remote Enable (Y/N)  .   .   .   .   .   .   .   .   Y
```

Setting this to Y will allow the Router to be configured remotely.

```
 8 Modem Answer On Ring Number (0 prevents answer)   .   .   .   .   .   1
```

This sets the number of rings the Router will wait before answering a call. For a line shared with voice calls, this number may be increased to allow time for a voice call to be answered before the router picks up the call.

```
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .   .   .   .   DIALIN
```

This instructs the router to answer incoming calls but not make outgoing calls.

```
15 Connection Timeout (sec) (0 to disable)      .   .   .   .   .   .  300
```

Once routable traffic has ceased, the Router will wait this period before tearing the call down. Whilst setting this to 0 will disable the timeout feature, this is not recommended in PSTN applications as occasionally modems may not detect a disconnect from the far end if a line is particularly noisy.

```
19 Ethernet LAN IP Address  .   .   .   .   .   .   .   .   192.168.0.1
```

This is the address of the Router on the LAN.

```
16 PPP Server Local Address      .   .   .   .   .   .   .  192.168.0.245
17 PPP Server Remote Address     .   .   .   .   .   .   .  192.168.0.246
```

These are the IP addresses which will be used for the PPP connection, the local address being that used by the router, and the remote address being the one allocated to the dialing in device. They should lie within the LAN subnet and must not be the same as the Router LAN address, nor should they lie within the DHCP Server range of addresses.

```
25 DHCP Start Address          0.0.0.0
26 DHCP Range                        0
```

Setting these to 0.0.0.0 and 0 to disables the DHCP server. In order to make devices accessible, they will probably be assigned fixed IP

Use GSM/PSTN to connect a local device/network to the internet/RAS Server, with dial-in support

These are typical settings where the Router is required to make a connection to the internet/RAS Server when there is data to be routed out of the local network, and to tear the connection down when traffic ceases. These settings will also allow dial-in access to devices on the local network using for example a PC and a modem.

```
=========================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                 =
=========================================================================
 0 Abandon Changes     .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .  <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .  <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    1
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    .  general.t-mobile.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    .    0800123456
12 Dialout Username    .    .    .    .    .    .    .    .    .      username
13 Dialout Password    .    .    .    .    .    .    .    .    .      password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .    .  ON_DEMAND
15 Connection Timeout (sec) (0 to disable)      .    .    .    .    .    .  300
16 PPP Server Local Address      .    .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .    .   00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask      .    .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)      .    .    .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .    0
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .   0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .    49390
28 Serial TCP Baudrate (1200 .. 115200)    .    .    .    .    .    .     9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)     .    .    .    .    .    .    .  NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)     0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .    .    .    .    0
35 Serial TCP Timeout (sec)      .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .  115200
37 Predial String      .    .    .    .    .    .    .    .    .  <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .    .   23
39 Command Line   .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

Notes:

```
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
```

These are the username and password which will be required by the dialing in device to establish a connection.

and source and destination ports remain unchanged. Note: For outgoing TCP connections where the source port is 21 (FTP), the address in the “227 Entering Passive Mode” command is changed to the WAN address of the router.

Dial In Connections

The Router will accept incoming PPP calls. The client dialing in is allocated the address specified in the PPP Remote Address configuration. By specifying an address within the local subnet, NAT is circumvented, thereby allowing the client to gain access to server applications.

DNS

When the Router makes a WAN connection, it will usually receive a DNS server address during PPP negotiation. If devices connected to the LAN are configured to use the Router as a DNS server, the Router will forward the requests to the dynamically allocated DNS, and return the results to the originating device.

DHCP

The Router includes a configurable DHCP server. This allows PC's which are configured to use DHCP to be connected to the Router without requiring reconfiguration.

Protocols

The Router supports TCP, UDP and ICMP PING transparently in both directions. PINGing the Router itself is also supported.

PPP Authentication

The Router supports PAP and CHAP authentication. The router will not accept a call where the source won't perform authentication.

Technical Details

The following paragraphs give technical details of the Router implementation.

IP Addresses

The Router connects two networks and therefore requires a valid IP address on each network. The IP address on the ethernet network is configured via the telnet session or the debug port. The WAN address is obtained dynamically during PPP negotiation. The requested WAN address is configurable in the telnet session, however most devices will refuse to negotiate a PPP connection if the requested address is anything other than 0.0.0.0.

Ping

The Router supports ping at the ethernet port, and also at the WAN port for dial in connections. The Router may be configured to silently discarded PINGs arriving at the WAN port thus preventing potentially harmful probing software detecting the Router.

Timeout

The Router ends a call after a period which is configurable via the telnet session or debug port. Only outgoing data keeps the connection live. This prevents potentially harmful probing software keeping the call up.

Network Address Translation (NAT)

Upon receipt of a data packet at the ethernet port, the source IP address and the ethernet MAC address are stored. The IP address in the packet is then replaced with the current WAN IP address, the port number is replaced with a unique port number, then the packet is forwarded to the WAN. Upon receipt of a data packet at the WAN port, the destination IP address is replaced with the source IP address stored earlier, the port number is replaced with the port number stored earlier, then the packet is forwarded to the ethernet port using the MAC address stored earlier. Note: For outgoing TCP connections where the destination port is 21 (FTP), the address in the “PORT” command is changed to the WAN address of the router.

Port Forwarding

When configured, the Router supports Port Forwarding to a single device. All traffic arriving at the WAN port with the WAN address as its destination address, is forwarded to the selected device. Note: The source address


```
 8 Modem Answer On Ring Number (0 prevents answer)   .   .   .   .   .   1
```

This sets the number of rings the Router will wait before answering a call. For a line shared with voice calls, ths number may be increased to allow time for a voice call to be answered before the router picks up the call.

```
11 Dialout Phone Number     .   .   .   .   .   .   .   .     0800123456
12 Dialout Username     .   .   .   .   .   .   .   .   .       username
13 Dialout Password     .   .   .   .   .   .   .   .   .       password
```

These are the details of where the Router will dial. This may be an ISP, or a private RAS Server.

```
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .   .   .      ON_DEMAND
```

This instructs the router to make a call when it receives data which requires routing.

```
15 Connection Timeout (sec) (0 to disable)      .   .   .   .   .   .  300
```

Once routable traffic has ceased, the Router will wait this period before tearing the call down. Whilst setting this to 0 will disable the timeout feature, this is not recommended in PSTN applications as occasionally modems may not detect a disconnect from the far end if a line is particularly noisy.

```
16 PPP Server Local Address      .   .   .   .   .   .   .  192.168.0.245
17 PPP Server Remote Address     .   .   .   .   .   .   .  192.168.0.246
```

These are the IP addresses which will be used for the PPP connection, the local address being that used by the router, and the remote address being the one allocated to the dialing in device. They should lie within the LAN subnet and must not be the same as the Router LAN address, nor should they lie within the DHCP Server range of addresses.

```
19 Ethernet LAN IP Address  .   .   .   .   .   .   .   .   192.168.0.1
```

This is the address of the Router on the LAN. Devices using the Router will need their default gateway address setting to this. If they want to use the Router for DNS, they will also need their DNS Server address setting to this value.

```
25 DHCP Start Address          0.0.0.0
26 DHCP Range                        0
```

Setting these to 0.0.0.0 and 0 to disables the DHCP server. In order to make devices accessible, they will probably be assigned fixed IP

Use GPRS - connect on demand

These are typical settings where the Router is required to make a GPRS connection when there is data to be routed out of the local network, and to tear the connection down when traffic ceases.

```
================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                       =
================================================================================
 0 Abandon Changes     .    .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .    .  <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .    .  <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    1
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)    .    .    .    . general.t-mobile.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    .       *99***1#
12 Dialout Username    .    .    .    .    .    .    .    .    .       username
13 Dialout Password    .    .    .    .    .    .    .    .    .       password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .    .  ON_DEMAND
15 Connection Timeout (sec) (0 to disable)     .    .    .    .    .    .  300
16 PPP Server Local Address      .    .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .    .    .  00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask     .    .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)     .    .    .    .  0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .    0
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .    .  0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .    49390
28 Serial TCP Baudrate (1200 .. 115200)    .    .    .    .    .    .     9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)     .    .    .    .    .    .     NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)     0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .    .    .    .    0
35 Serial TCP Timeout (sec)      .    .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .   115200
37 Predial String     .    .    .    .    .    .    .    .    .  <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .    .   23
39 Command Line   .    .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

Notes:

```
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    0
```

Setting this to 0 prevents incoming calls being answered. Note: If a GPRS connection is established, incoming calls are ignored.

```
10 Dialout GPRS Access Point Name (APN)    .    .    .    . general.t-mobile.uk
```

This is the Access Point Name which determines where the GPRS connection will terminate. See the appendix for common APNs used to

Serial Streaming

By setting configuration parameters 27 .. 32, the Router can give either a local or remote device access to an RS232 serial port. Note: This is a three-wire interface and handshaking is not supported.

The Router waits for an incoming TCP connection on the configured port. Data received from the connection is sent out of the serial port. Data received by the serial port is forwarded through the connection based on the configuration parameters.

Command Line

The Router has a command line which is accessible both via the debug port, and via the Telnet configuration menu (item 36).

Warning: Use the command line with caution - Changing some settings may render the Router inoperable.

The following commands display signal strength , and GPS location (GPS enabled model only).

RSSI

This command displays the signal strength using the values 0 to 31. A signal strength of 8 or more is usually sufficient for reliable communication. The value is updated every 15 seconds when a call is down. When a call is up, the last value prior to the cal is returned.

GPS

For Routers fitted with the GPS option, this command displays the current location and speed etc. using standard NEMA format. The information is repeated for approximately one minute or may be terminated by pressing any key.

access the internet. Note: Some network providers use different APNs to access the internet depending upon whether the SIM is “on contract”, or “pay as you go”.

```
11 Dialout Phone Number     .   .   .   .   .   .   .   .       *99***1#
```

This is the "magic number" used to establish a GPRS connection.

```
12 Dialout Username     .   .   .   .   .   .   .   .   .       username
13 Dialout Password     .   .   .   .   .   .   .   .           password
```

These are the details which will be used to establish the GPRS connection. For standard connections to the internet, values are usually required though they are not checked. For private APNs the values are usually significant.

```
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)       .   .   .      ON_DEMAND
```

This instructs the router to make a call when it receives data which requires routing.

```
15 Connection Timeout (sec) (0 to disable)      .   .   .   .   .   .  300
```

Once routable traffic has ceased, the Router will wait this period before tearing the call down.

```
19 Ethernet LAN IP Address  .   .   .   .   .   .   .   .    192.168.0.1
```

This is the address of the Router on the LAN. Devices using the Router will need their default gateway address setting to this. If they want to use the Router for DNS, they will also need their DNS Server address setting to this value.

```
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)      .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .   .   .   .   .   .   25
```

These settings control the Router's built in DHCP server. Note: This should be in the same subnet as the LAN. If there is already a DHCP server on the network, set these to 0.0.0.0 and 0 to disable the DHCP server in the Router.

About this Booklet

This is a user manual for the Comtech's family of GSM/GPRS and PSTN Routers. The manual shows how to connect the eRouter to a PC, configure the Router, and then make connections to and from the Router over GSM/GPRS or PSTN as appropriate.

The latest version of this manual can be found on our web site:
http://www.comtech.uk.com/downloads/routers/

Additional Assistance

Additional assistance is available:

- Email Support: support@comtech.uk.com
- Download Area (requires login):
  http://www.comtechm2m.com/Downloads/Routers
- Support Forums (requires login):
  http://www.comtechm2m.com/support/forum/
  Comtech have dedicated resources for Internet based technical support.
- Firmware upgrades:: www.comtechm2m.com/downloads/Routers

CE

Notes:

Use GPRS - permanent connection

These are typical settings where the Router is required to make a permanent GPRS connection. Since GPRS data is charged by traffic rather than connection time, this is a commonly used configuration. Note: Use of the Automated PING feature (23,24) is strongly recommended in GPRS always connected applications.

```
================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                       =
================================================================================
 0 Abandon Changes      .    .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .    .  <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .    .  <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    0
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    .    . general.t-mobile.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    .      *99***1#
12 Dialout Username     .    .    .    .    .    .    .    .    .      username
13 Dialout Password     .    .    .    .    .    .    .    .    .      password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .    .   PERMANENT
15 Connection Timeout (sec) (0 to disable)     .    .    .    .    .    .  300
16 PPP Server Local Address      .    .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .    .    .  00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask     .    .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)      .    .    .    .  0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .   60
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .    .  0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .    .  49390
28 Serial TCP Baudrate (1200 .. 115200)     .    .    .    .    .    .    .   9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)      .    .    .    .    .    .    .  NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)      0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)     .    .    .    .    0
35 Serial TCP Timeout (sec)      .    .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .  115200
37 Predial String       .    .    .    .    .    .    .    .    .  <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .    .   23
39 Command Line    .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

Notes:

```
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    0
```

Setting this to 0 prevents incoming calls being answered. Note: If a GPRS connection is established, incoming calls are ignored.

```
10 Dialout GPRS Access Point Name (APN)     .    .    .    . general.t-mobile.uk
```



```
================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                       =
================================================================================
 0 Abandon Changes      .    .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .    .  <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .    .  <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .    .    .    .    .    1
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    .    .    .    wyless.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    .  0800 123456
12 Dialout Username     .    .    .    .    .    .    .    .    .  username
13 Dialout Password     .    .    .    .    .    .    .    .    .  password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .    .   DIALIN
15 Connection Timeout (sec) (0 to disable)     .    .    .    .    .    .    0
16 PPP Server Local Address      .    .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address     .    .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .    .    .  00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask     .    .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)      .    .    .    .  0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .    0
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .    .  0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .    .  49390
28 Serial TCP Baudrate (1200 .. 115200)     .    .    .    .    .    .    .   9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)      .    .    .    .    .    .    .  NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)      0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)     .    .    .    .    0
35 Serial TCP Timeout (sec)      .    .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .  115200
37 Predial String       .    .    .    .    .    .    .    .    .  <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .    .   23
39 Command Line    .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

Debug Port

The Router has an RS232 debug port which may be used to set the configuration parameters and to assist with diagnosing problems. The debug information includes error messages identifying SIM and network problems. It also includes the Router username, password, and IP address which are required to establish a telnet session to configure the Router.

Connect a PC running a terminal emulation package (eg. Hyperterminal) set to 115200 baud, 1 start, 8 data, no parity, 1 stop, no handshake.

Once powered up, the router sends diagnostic information to PC. Debug information is suspended for one minute when any key is pressed. To change configuration parameters, press Enter to suspend debug information, and access the command line. Type “menu” then press Enter to access the Menu. The first page of the current configuration settings is displayed. Press Enter to view the next page.

To change a configuration setting, type the number of the setting to change, then press Enter. At the prompt, enter the new value. After making the changes, press '1', followed by Enter, to save the changes. The changes are retained during power down.

A typical configuration is shown overleaf.

This is the Access Point Name which determines where the GPRS connection will terminate. See the appendix for common APNs used to access the internet. Note: Some network providers use different APNs to access the internet depending upon whether the SIM is “on contract”, or “pay as you go”.

```
11 Dialout Phone Number     .   .   .   .   .   .   .   .       *99***1#
```

This is the "magic number" used to establish a GPRS connection.

```
12 Dialout Username     .   .   .   .   .   .   .   .   .       username
13 Dialout Password     .   .   .   .   .   .   .   .           password
```

These are the details which will be used to establish the GPRS connection. For standard connections to the internet, values are usually required though they are not checked. For private APNs the values are usually significant.

```
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .   .   .      PERMANENT
```

This instructs the router to make a call at power-up, and keep it permanently up.

```
15 Connection Timeout (sec) (0 to disable)      .   .   .   .   .   .   0
```

Disable inactivity timeout.

```
19 Ethernet LAN IP Address  .   .   .   .   .   .   .   .   192.168.0.1
```

This is the address of the Router on the LAN. Devices using the Router will need their default gateway address setting to this. If they want to use the Router for DNS, they will also need their DNS Server address setting to this value.

```
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)      .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .   .   .   .   .   .   25
```

These settings control the Router's built in DHCP server. Note: This should be in the same subnet as the LAN. If there is already a DHCP server on the network, set these to 0.0.0.0 and 0 to disable the DHCP server in the Router.

```
23 Automated PING Address (0.0.0.0 PINGs DNS server)      .   .   .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .   .   .   .   .   .   60
```

These control the ping connection integrity check. The address is the address to ping, and the period the time between pings. If a ping does not receive a reply after three attempts, the Router assumes the GPRS

attachment has been lost, and tears down, then reestablishes the connection. The address should be set to an address of particular interest eg. the server the local devices will be connecting to. If a period is set, but the address is set to 0.0.0.0, the Router pings the DNS Server who's address it received from the network when the GPRS attachment was made. The period should be set based on how important loss of connectivity is, versus the cost of sending and receiving ping packets. Use of this feature is strongly recommended in GPRS always connected applications.

Warning: There are no restrictions on what commands may be sent to the modem and whilst some are useful (eg. AT+CSQ to get signal strength), others may render the router inoperable.

A full list of commands is available at:
http://www.comtechm2m.com/Downloads/GsmGprsModems/OEM-GPRS-2E/Gprs_at.pdf

Sending an SMS

The GPRS/GSM Router supports sending SMSs by allowing a TCP connection directly to the modem. Note: Making the connection takes precedence over routing. If a call is up when the connection is made, the call will be torn down. Whilst most applications will use a program to send the SMS, for demonstration purposes, a telnet client may used. Hyperterminal or similar is recommended as the command line client in WindowsXP performs local echo which cannot be turned off from the keyboard, making sending the SMS confusing.

The following procedure will send an SMS:

1) Use Hyperterminal or similar to make a TCP/IP (Winsock) connection to the LAN address (192.168.0.1 by default) of the router on port 49389. If the router has a call up, it will take approximately 15 seconds for the router to tear the call down before allowing access to the modem.

2) Verify communication with the modem by typing AT followed by carriage return. The modem should respond with "OK"

```
AT
OK
```

3) Type AT+CMGS="phone_number" (including the quotes) then press carriage return. The modem should reply with a chevron prompt.

```
AT+CMGS="0800123456"
>
```

4) Type the message, then press <CTRL Z> to finish. The <CTRL Z> may or may not be visible depending upon which telnet client you are using. After a few seconds, the modem should reply with a send number, followed by OK

```
>This is the message.
+CMGS: 206

OK
```

5) To terminate the connection to the modem, close the telnet session. Note: There is a 60 second timeout on the connection ie. If the connection remains open for 60 seconds, but no characters are sent to the modem, the router will close the connection.

addresses, and not use DHCP.

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Use GPRS to provide an access point into a remote device

When a GPRS connection is made, the connecting device receives an IP address which is usually private and dynamic. In order to access the internet, the network provider supports routing between their private network, and the internet. This invariably involves Network Address Translation (NAT) and Port Address Translation (PAT). Their router providing this functionality however acts as a firewall blocking all traffic where a connection is trying to be made from the internet into their private network. SIMS are however available which receive static, private IP addresses, and there are methods of accessing the private network. Contact sales@comtechm2m.com for further details. Using such a SIM, and enabling IP forwarding, as shown below, allows a single device to be remotely accessed using GPRS. Note: Use of the Automated PING feature (23,24) is strongly recommended in GPRS always connected applications.

```
================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                        =
================================================================================
 0 Abandon Changes     .    .    .    .    .    .    .    .    .    .    .    .
 1 Save Changes And Reboot  .    .    .    .    .    .    .    .    .    .    .
 2 Factory Defaults (Save Changes to apply)     .    .    .    .    .    .    .
 3 Configuration Username   .    .    .    .    .    .    .    .    .  username
 4 Configuration Password   .    .    .    .    .    .    .    .    .  password
 5 Configuration Remote Enable (Y/N)  .    .    .    .    .    .    .    .    Y
 6 Modem Initialisation String   .    .    .    .    .    .    .    .  <None Set>
 7 Modem SIM PIN Number     .    .    .    .    .    .    .    .    .  <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)    .    .    .    .    .    0
 9 Modem Reset Interval (mins) (0 to disable)   .    .    .    .    .    .    0
10 Dialout GPRS Access Point Name (APN)     .    .    .    .  general.t-mobile.uk
11 Dialout Phone Number     .    .    .    .    .    .    .    .       *99***1#
12 Dialout Username     .    .    .    .    .    .    .    .    .       username
13 Dialout Password     .    .    .    .    .    .    .    .    .       password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)      .    .    .    .    PERMANENT
15 Connection Timeout (sec) (0 to disable)      .    .    .    .    .    .  300
16 PPP Server Local Address     .    .    .    .    .    .    .  192.168.0.245
17 PPP Server Remote Address    .    .    .    .    .    .    .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .    .   00-05-11-55-55-55
19 Ethernet LAN IP Address  .    .    .    .    .    .    .    .    192.168.0.1
20 Ethernet LAN Subnet Mask     .    .    .    .    .    .    .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .    .    .    .    .    .   25
23 Automated PING Address (0.0.0.0 PINGs DNS server)      .    .    .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .   60
25 Respond to PING on WAN (Y/N)  .    .    .    .    .    .    .    .    .    Y
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .   0.0.0.0
27 Serial TCP Port (0 to disable)     .    .    .    .    .    .    .    49390
28 Serial TCP Baudrate (1200 .. 115200)    .    .    .    .    .    .    9600
29 Serial TCP Data Bits (7, 8)   .    .    .    .    .    .    .    .    .    8
30 Serial TCP Parity (NONE, ODD, EVEN)     .    .    .    .    .    .    .  NONE
31 Serial TCP Stop Bits (1, 2)   .    .    .    .    .    .    .    .    .    1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)     0
33 Serial TCP Forwarding Length (0 to disable)  .    .    .    .    .    .    1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .    .    .    .    0
35 Serial TCP Timeout (sec)      .    .    .    .    .    .    .    .    .   60
36 Modem Max Baud Rate (57600, 115200, 230400)  .    .    .    .    .    .  115200
37 Predial String     .    .    .    .    .    .    .    .    .  <None Set>
38 Telnet Configuration Port     .    .    .    .    .    .    .    .    .   23
39 Command Line   .    .    .    .    .    .    .    .    .    .    .    .    .

Select >
```

LED	DESCRIPTION
POWER	Lights Red when the unit is powered up. Changes to Orange whilst the modem registers with the network. Changes to Red, with a short Orange flash approximately every two seconds, when the modem is registered with the network.
SIGNAL STRENGTH /CALL	For GSM/GPRS Routers this LED flashes Orange to indicate signal strength. Flashes / CSQ / Signal 0 / 0 .. 4 / None 1 / 5 .. 7 / Weak 2 / 8 .. 9 / Moderate 3 / 10 .. 14 / OK 4 / 15 .. 31 / Good Lights Orange when a call is established and PPP has finished negotiation ie. lights when the router is ready to pass data.
TX	Flashes Green when data is detected at the ethernet port. This data will be passed to the WAN port if the Orange LED is lit.
RX	Flashes Green when data is received at the WAN port for routing to the ethernet port.

Figure 3 : LED Indicators

Status LEDs

The Router is equipped with 4 status LEDs.

At power up, all four LEDs will light and remain lit for approximately 20 seconds whilst the Router verifies its firmware.

The SIGNAL STRENGTH/CALL, TX, and RX LEDs will then flash simultaneously for approximately 30 seconds whilst the modem is initialised. For the GSM/GPRS Router, if the SIM is missing, locked, or the Router is unable to register with the network, the SIGNAL STRENGTH/CALL, TX, and RX LEDs will continue to flash.

Thereafter, the LEDS will indicate call status as per Figure 3 opposite.

The SIGNAL STRENGTH/CALL, TX, and RX LEDs also flash simultaneously whilst a call is being torn down, and the modem is being reinitialised ready to make the next call.

Notes:

```
 8 Modem Answer On Ring Number (0 prevents answer)   .   .   .   .   .   0
```

Setting this to 0 prevents incoming calls being answered. Note: If a GPRS connection is established, incoming calls are ignored.

```
11 Dialout Phone Number     .   .   .   .   .   .   .   .       *99***1#
```

This is the "magic number" used to establish a GPRS connection.

```
12 Dialout Username     .   .   .   .   .   .   .   .   .       username
13 Dialout Password     .   .   .   .   .   .   .   .           password
```

These are the details which will be used to establish the GPRS connection. For standard connections to the internet, values are usually required though they are not checked. For private APNs the values are usually significant.

```
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)       .   .   .       PERMANENT
```

This instructs the router to make a call at power-up, and keep it permanently up.

```
15 Connection Timeout (sec) (0 to disable)      .   .   .   .   .   .   0
```

Disable inactivity timeout.

```
10 Dialout GPRS Access Point Name (APN)     .   .   .   . general.t-mobile.uk
```

This is the Access Point Name which determines where the GPRS connection will terminate. See the appendix for common APNs used to access the internet. Note: Some network providers use different APNs to access the internet depending upon whether the SIM is “on contract”, or “pay as you go”.

```
19 Ethernet LAN IP Address  .   .   .   .   .   .   .   .   192.168.0.1
```

This is the address of the Router on the LAN. Devices using the Router will need their default gateway address setting to this. If they want to use the Router for DNS, they will also need their DNS Server address setting to this value.

```
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)      .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .   .   .   .   .   .   25
```

These settings control the Router's built in DHCP server. Note: This

should be in the same subnet as the LAN. If there is already a DHCP server on the network, set these to 0.0.0.0 and 0 to disable the DHCP server in the Router.

```
23 Automated PING Address (0.0.0.0 PINGs DNS server)      .    .    .   0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .    .    .    .    .    .  60
```

These control the ping connection integrity check. The address is the address to ping, and the period the time between pings. If a ping does not receive a reply after three attempts, the Router assumes the GPRS attachment has been lost, and tears down, then reestablishes the connection. The address should be set to an address of particular interest eg. the server the local devices will be connecting to. If a period is set, but the address is set to 0.0.0.0, the Router pings the DNS Server who's address it received from the network when the GPRS attachment was made. The period should be set based on how important loss of connectivity is, versus the cost of sending and receiving ping packets. Use of this feature is strongly recommended in GPRS always connected applications.

```
26 IP Forwarding Address (0.0.0.0 to disable)   .    .    .    .    .   0.0.0.0
```

This is the address which traffic sent to the Router WAN address (ie. that set by the SIM) will be forwarded on to. Note: If Remote Configuration is enabled, then traffic destined for port 23 (Telnet) will be sent to the Router configuration session, rather than forwarded. Note: Ping traffic is forwarded - It is up to the destination device to respond to the ping if it so chooses.

No.	PARAMETER	DESCRIPTION
36	Modem Max Baudrate	This setting allows the baud rate to the modem to be limited
37	Predial String	An optional string (typically an AT command) which will be sent to the modem immediately before dialing.
38	Telnet Configuration Port Number	The TCP port number used by the telnet configuration session (typically 23).
39	Command Line	Exit menu and go to command line mode

Configuration Parameters

This section of the manual lists the configuration parameters and gives details of how they affect the operation of the Router.

Configuration Parameters		
No.	**PARAMETER**	**DESCRIPTION**
0	Abandon Changes	Abandon Changes and close the Telnet session
1	Save Changes	Save changes, close the telnet session and reboot.
2	Factory Defaults	Restore factory default settings. Select Save Changes to make the settings permanent.
3	Configuration Username	Username required to establish a local telnet session for configuration, and to establish a Dial In connection.
4	Configuration Password	Password required to establish a local telnet session for configuration, and to establish a Dial In connection
5	Configuration Remote Enable	Enable remote configuration over the WAN when router dials out.
6	Modem Initialisation String	The string used to initialise the modem. **Warning: An incorrect initialisation string may prevent the router from operating.**
7	Modem SIM PIN Number	PIN number to unlock SIM. Set to blank if the SIM does not require a PIN number. This is ignored if the SIM does not require a PIN number.

No.	PARAMETER	DESCRIPTION
26	IP Forwarding Address	IP packets arriving from the WAN which cannot be Network Address Translated, are forwarded to this address. Set to 0.0.0.0 to disable this feature. This is how a server is accessed.
27	Serial TCP Port	The TCP port number which is routed to the serial port. Set to 0 to disable this feature.
28	Serial TCP Baudrate	Baudrate of the serial port.
29	Serial TCP Data Bits	7 or 8 data bits per byte
30	Serial TCP Parity	None, Odd, Even parity
31	Serial TCP stop bits	1 or 2
32	Serial TCP Forwarding Character	A character which forces accumulated serial data to be sent. Set to 0 to disable this feature. Set to 256 to forward on NULL.
33	Serial TCP Forwarding Length	A length of data which forces accumulated data to be sent. Set to 0 to disable this feature.
34	Serial TCP Forwarding Timeout	An idle period which forces accumulated data to be sent. Set to 0 to disable this feature
35	Serial TCP Timeout (sec)	If no data is received from the WAN, the TCP socket is closed after this period.

No.	PARAMETER	DESCRIPTION
8	Modem Answer On Ring Number	This sets the number of rings the Router will wait before answering a call. For a line shared with voice calls, ths number may be increased to allow time for a voice call to be answered before the router picks up the call. Setting this to 0 prevents calls being answered.
9	Modem Reset Interval	Reset the modem at regular intervals if it isn't in a call.
10	Dialout GPRS Access Point Name (APN)	Access Point Name to terminate the GPRS connection.
11	Dialout Phone Number	Phone number of the Internet Service Provider. For GPRS this may include '*' and '#' characters.
12	Dialout Username	Login username. For GPRS, a name is typically required, though any name is usually accepted for access to an Internet APN.
13	Dialout Password	Login password. For GPRS, a password is typically required, though any password is usually accepted for access to an internet APN.
14	Connection Type	DIALIN prevents outgoing calls. ON_Demand makes a call whenever the router receives routable traffic at the Ethernet port. PERMANENT maintains a permanent connection regardless of traffic.
15	Connection Timeout	Period after last outgoing packet, after which the router will tear the call down. Set to 0 to disable this feature.

No.	PARAMETER	DESCRIPTION
16	PPP Server Local Address	The IP address used by the Router when it accepts an incoming call.
17	PPP Server Remote Address	Address allocated via PPP to the remote device when an incoming call is answered.
18	Ethernet MAC Address	MAC address of the Router ethernet port.
19	Ethernet LAN IP Address	IP address of the Router Ethernet port.
20	Ethernet LAN Subnet Mask	Subnet mask for the ethernet port
21	Ethernet DHCP Server Start Address	Lowest address the DHCP server will offer. Set to 0.0.0.0 to disable the DHCP server.
22	Ethernet DHCP Server Range	Range of addresses the DHCP server will offer. Set to 0 to disable the DHCP server.
23	Automated PING Address	This address is pinged at the Ping Period, to maintain the GPRS connection and to verify the connection integrity. Set to 0.0.0.0 to ping the DNS server negotiated during PPP.
24	Automated PING Period	The Ping Address is pinged at this period to maintain the GPRS connection and to verify the connection integrity. Set to 0 to disable this feature. Maximum value 28800 = 8 hours.
25	Respond to PING on WAN	Setting this to Y allows the router to respond to Pings on the WAN port. Note: if IP forwarding is enabled, the Pings are forwarded to the destination device which may or may not respond.

Notes:

Getting Started

This section of the manual will guide you through setting up and configuring the Router for typical applications:

1) Check the contents of the Starter Kit

2) Install a SIM (GSM/GPRS only)

3) Connect a PC for configuration

4) Configure the Router for typical applications

Check the contents of the Starter Kit

Use the illustration and table overleaf to check the contents of the Starter Kit.

Starter Kit Contents

Figure 1 : Starter kit content (GPRS Version)

Qty	Item	Comtech Part No
1	uWEBox eRouter GPRS (900/1800MHz)	
1	110/230VAC to 9VDC/1.7A power supply	PSU-0012
1	9V-36VDC input filter cable*	CABLE-027
1	S-Blade 850/900/1800/1900MHz SMA male plug 1 metre (GPRS Version)	ANTENNA-02
1	PSTN cable (PSTN Version)	CABLE-BT431-RJ11
1	Ethernet Crossover Cable	CABLE-001
1	9 way Serial Cable	CABLE-DATA
1	Getting Started Guide (this document)	RouterUM.PDF

* this must be used if the unit is to be powered from a low voltage power source

Country	Type	+GCI code
Japan	Japan	0
Luxembourg (TBR21+ATAAB)	TBR21	69
Malaysia	Malaysia	6C
Mexico	Mexico	73
Netherlands (TBR21+ATAAB)	TBR21	7B
New Zealand	NZ	7E
Norway (TBR21+ATAAB)	TBR21	82
Paraguay	FCC	87
Philippines	Philippines	89
Poland	TBR21	8A
Portugal (TBR21+ATAAB)	TBR21	8B
Russia	GOST	B8
Singapore	TAS	9C
South Africa	SA	9F
South Korea	FCC	61
Spain (TBR21+ATAAB)	TBR21	A0
Sweden (TBR21+ATAAB)	TBR21	A5
Switzerland (TBR21+ATAAB)	TBR21	A6
Taiwan	Taiwan	FE
United Kingdom (TBR21+ATAAB)	TBR21	B4
United States of America (USA)	FCC	B5

Country	Type	+GCI code
Australia	AUS	9
Austria (TBR21+ATAAB)	TBR21	A
Belgium (TBR21+ATAAB)	TBR21	F
Brazil	Brazil	16
Bulgaria	TBR21	1B
Canada	FCC	20
China	China	26
Columbia	FCC	27
Czech Republic	TBR21	2E
Denmark (TBR21+ATAAB)	TBR21	31
Ecuador	FCC	35
Finland (TBR21+ATAAB)	TBR21	3C
France (TBR21+ATAAB)	TBR21	3D
Germany (TBR21+ATAAB)	TBR21	42
Greece (TBR21+ATAAB)	TBR21	46
Hong Kong	Hong Kong	50
Hungary	Hungary	51
India	India	53
Ireland (TBR21+ATAAB)	TBR21	57
Israel	TBR21	58
Italy (TBR21+ATAAB)	TBR21	59

Install a SIM (GSM/GPRS only)

To use the GSM/GPRS Router, the user will need to provide a SIM. The user will also need to arrange suitable enabling with the network provider based upon the application:

1) For outgoing GSM calls, no special provision is required.

2) For incoming GSM calls, the SIM will need to be "data enabled for incoming GSM data calls". Note: When a SIM is data enabled, it will have two phone numbers, a voice number and a data number. It is the data number which will need to be called.

3) For outgoiong GPRS connectivity, the SIM will need to be “enabled for GPRS”.

4) For incoming GPRS connectivity, the SIM will need to be “enabled for GPRS and have an accessible IP address”. A device making a GPRS connection usually receives a dynamic, private, IP address to which a connection from the internet can not be made. There are ways round this - Contact sales@comtechm2m.com for details.

To install a SIM in the Router, proceed as follows:

1) Disconnect power

2) Remove the four screws which hold the front panel (the one with the LEDs) in place.

3) Slide out the PCBs.

4) Insert a SIM into the SIM socket.

5) Slide the PCBs back into the case

6) Replace the four screws.

Connect a PC for configuration

The Router is configured by establishing a telnet session using a PC. Alternatively, an RS232 connection may be made to the debug port— See later. Suitable settings for typical applications are discussed in subsequent sections of this manual.

1) Connect up the Router

2) Prepare the PC

3) Establish a Telnet Session

4) Change the Configuration Settings

Modem Homologation (PSTN)

Note: This applies to PSTN Routers only.

PSTN modems require configuration for correct operation in different countries. In the Router, this is accomplished by appending a country specific suffix to the modem initialisation string (item 23 in the telnet configuration session).

1) Locate the country in the tables on the following pages.

2) Establish a telnet configuration session with the router.

3) Get the +GCI code (one or two alphanumeric digits) from the table.

4) Modify the modem initialisation string by appending:

   +GCI=xx

   (where xx is the +GCI code from the table)

5) Save the changes and exit.

   eg. The modem initialisation string for a PSTN router operating in the USA would be:

   ATX0V1&D2+GCI=B5

Ordering Information

The following table shows the present variants available from Comtech Holdings Ltd:

Order Code	Details
FR06000211	uWEBox eRouter GSM/GPRS RoHS
FR06000210	uWEBox eRouter GSM/GPRS RoHS Starter Kit
FR06000215	uWEBox eRouter PSTN RoHS
FR06000216	uWEBox eRouter PSTN RoHS Starter Kit

Notes:

Universal 110/230VAC power supply order code is PSU-0012. This is included in the starter kit, and is also available as an accessory item.

For applications which have a DC power supply (9-36VDC) available which is capable of supplying 1.7ADC please order accessory lead “CABLE-027”. This filtered PSU lead is approximately 2m in length with bare wire termination allowing it to be adapted to use and is required for CE compliance.

The eRouter enclosure can be attached to a flat surface using accessory L-shaped brackets (accessory item CASE-0013/M) that fit into the extrusions down the side of the unit. Typically two brackets are required to secure the unit.

For details of alternative GSM antennas available from Comtech please visit our website at http://www.comtechm2m.com

Connect up the Router

The diagram below shows how to connect the components in the Starter Kit.

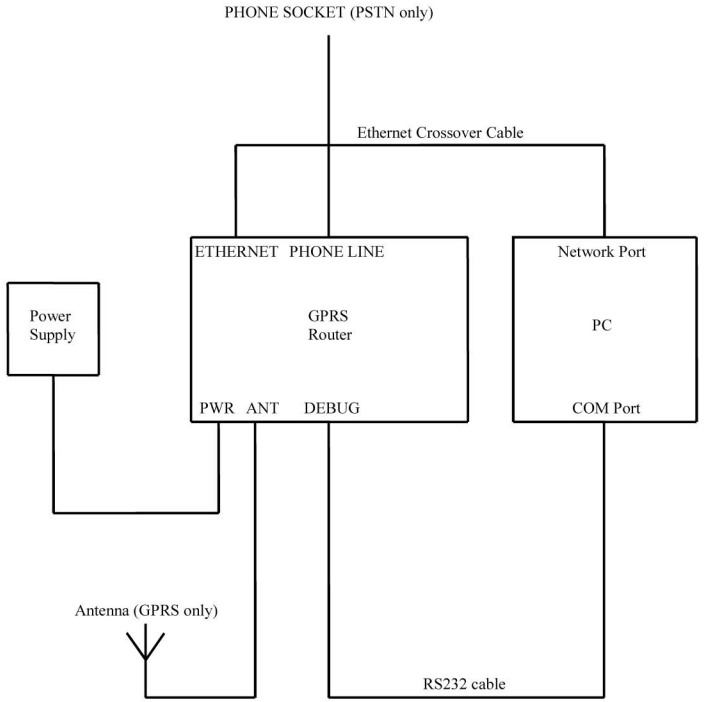

Figure 2: Starter kit connection

Prepare the PC

The Router is configured by making a telnet connection to its telnet server using a PC. The PC should be disconnected from all networks, in order that its network connection settings may be changed without disrupting other networks. In addition, all applications which may attempt to use a network should be closed. Routers are shipped with a default IP address of 192.168.0.1 which may be changed once the telnet session had been established. Configure the PC either to use DHCP, or to have a fixed address on the same subnet as the Router e.g. IP address 192.168.0.10, subnet mask 255.255.255.0. If the PC is to be used verify Router functionality, it will require its gateway address, and DNS address to be set to the address to which the Router is configured e.g. 192.168.0.1 assuming the Router address is left at its default setting.

Establish a Telnet Session

Once the PC has been configured, connect its ethernet port to the Router's ethernet port using the ethernet crossover cable provided. Power up the Router and wait 30 seconds to allow it to boot. A telnet session may be started on the PC using Start>Run>telnet <ip_address>.

EC Declaration of Conformity PSTN Version

EC Declaration of Conformity

We: Comtech Holdings Ltd
Comtech House
28 Manchester Road
Westhougton
Bolton, BL5 3QJ
Lancs
United Kingdom

Declare under our sole responsibility that the following product:

Model description: µWEBox eRouter PSTN
Model #: FR06000215

Meets the essential requirements of the European Directives

89/336 EMC Directive
73/23/EEC Low Voltage Directive
1999/5/EC Radio Equipment & Telecommunications Terminal Equipment Directive

and is in conformity with the following relevant harmonised standards:

EN 55022: 1998 (Class B)
EN 55024: 1998 (Industrial)
EN 301 489-7 V1.2.1: 2002
EN 50121-3-2 : 2000
EN 60950-1 : 2002

Name: Jonathan Shires Position: Engineering Director

Signature: Date: 23rd August 2006

On behalf of Comtech Holdings Ltd

EC Declaration of Conformity GPRS/GSM Version

We:

Comtech Holdings Ltd
Comtech House
28 Manchester Road
Westhougton
Bolton, BL5 3QJ
Lancs
United Kingdom

Declare under our sole responsibility that the following product:

Model description: µWEBox eRouter GSM/GPRS
Model #: FR06000211

Meets the essential requirements of the European Directives

89/336	EMC Directive
73/23/EEC	Low Voltage Directive
1999/5/EC	Radio Equipment & Telecommunications Terminal Equipment Directive
95/54/EEC	Vehicle EMC Directive ("e"-mark #: E11 033945)

and is in conformity with the following relevant harmonised standards:

EN 301 489-7 V1.2.1: 2002
EN 50121-3-2 : 2000
EN 60950-1:2002

Name: Jonathan Shires Position: Engineering Director

Signature: Date: 23rd August 2006

On behalf of Comtech Holdings Ltd

Change the Configuration Settings

When the telnet session connects, the user will be prompted to enter a username and password. Routers are shipped with these set to "username" and "password" respectively. These may be changed after logging in.

Once logged in, the first page of the current configuration settings are displayed. Press Enter to view the next page.

```
Router CPU Flash build: May  8 2006 13:49:24 $Name:  $

Username : username
Password : ********

================================================================================
=           Router CPU Flash build: Xxx xx xxxx xx:xx:xx                       =
================================================================================
 0 Abandon Changes      .   .   .   .   .   .   .   .   .   .   .   .   .
 1 Save Changes And Reboot  .   .   .   .   .   .   .   .   .   .   .   .
 2 Factory Defaults (Save Changes to apply)     .   .   .   .   .   .   .
 3 Configuration Username   .   .   .   .   .   .   .   .   .   .  username
 4 Configuration Password   .   .   .   .   .   .   .   .   .   .  password
 5 Configuration Remote Enable (Y/N)  .   .   .   .   .   .   .   .   .   Y
 6 Modem Initialisation String   .   .   .   .   .   .   .   .  <None Set>
 7 Modem SIM PIN Number      .   .   .   .   .   .   .   .   .  <None Set>
 8 Modem Answer On Ring Number (0 prevents answer)   .   .   .   .   .   1
 9 Modem Reset Interval (mins) (0 to disable)   .   .   .   .   .   .   0
10 Dialout GPRS Access Point Name (APN)     .   .   .   .  general.t-mobile.uk
11 Dialout Phone Number     .   .   .   .   .   .   .   .   .  01489604407
12 Dialout Username     .   .   .   .   .   .   .   .   .   .     username
13 Dialout Password     .   .   .   .   .   .   .   .   .   .     password
14 Connection Type (DIALIN/ON_DEMAND/PERMANENT)     .   .   .   .   .  DIAL_IN
15 Connection Timeout (sec) (0 to disable)      .   .   .   .   .   .  300
16 PPP Server Local Address     .   .   .   .   .   .   .   .  192.168.0.245
17 PPP Server Remote Address    .   .   .   .   .   .   .   .  192.168.0.246
18 Ethernet MAC Address (last 6 digits eg. 1a2b3c)   .   .   .  00-05-11-55-55-55
19 Ethernet LAN IP Address  .   .   .   .   .   .   .   .   .   192.168.0.1
20 Ethernet LAN Subnet Mask     .   .   .   .   .   .   .   .  255.255.255.0
21 Ethernet DHCP Server Start Address (0.0.0.0 to disable)     .  192.168.0.100
22 Ethernet DHCP Server Range (0 to disable)    .   .   .   .   .   .   .  25
23 Automated PING Address (0.0.0.0 PINGs DNS server)     .   .   .   .  0.0.0.0
24 Automated PING Period (sec) (0 to disable)   .   .   .   .   .   .   .   0
25 Respond to PING on WAN (Y/N)  .   .   .   .   .   .   .   .   .   .   Y
26 IP Forwarding Address (0.0.0.0 to disable)   .   .   .   .   .   .  0.0.0.0
27 Serial TCP Port (0 to disable)     .   .   .   .   .   .   .   .   .  49390
28 Serial TCP Baudrate (1200 .. 115200)    .   .   .   .   .   .   .   .  9600
29 Serial TCP Data Bits (7, 8)   .   .   .   .   .   .   .   .   .   .   8
30 Serial TCP Parity (NONE, ODD, EVEN)     .   .   .   .   .   .   .   .  NONE
31 Serial TCP Stop Bits (1, 2)   .   .   .   .   .   .   .   .   .   .   1
32 Serial TCP Forwarding Character (decimal) (256 = '\0') (0 to disable)     0
33 Serial TCP Forwarding Length (0 to disable)  .   .   .   .   .   .   .   1
34 Serial TCP Forwarding Timeout (msec) (0 to disable)    .   .   .   .   .   0
35 Serial TCP Timeout (sec)     .   .   .   .   .   .   .   .   .   .   .  60
36 Modem Max Baud Rate (57600, 115200, 230400)  .   .   .   .   .   .  115200
37 Predial String       .   .   .   .   .   .   .   .   .   .  <None Set>
38 Telnet Configuration Port    .   .   .   .   .   .   .   .   .   .   .  23
39 Command Line   .   .   .   .   .   .   .   .   .   .   .   .   .   .   .

Select >
```

Each item is discussed in detail later.

To change a configuration setting, type the number of the setting to